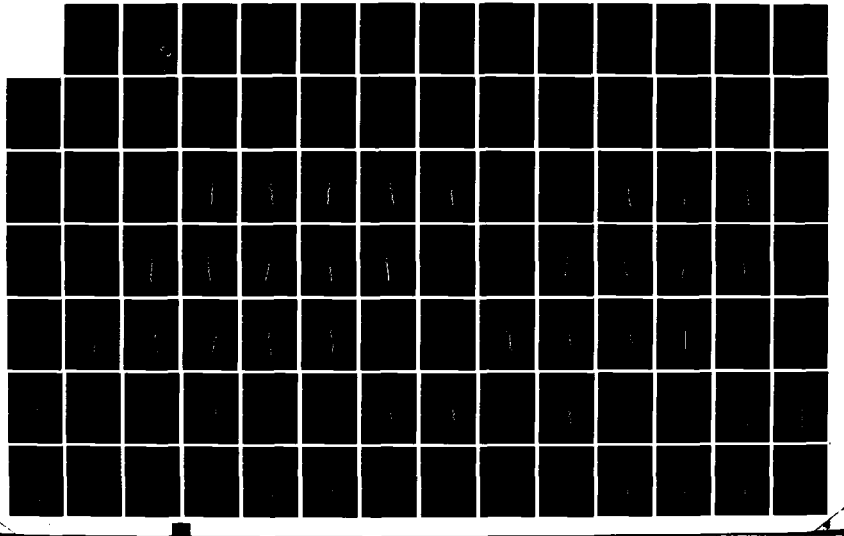
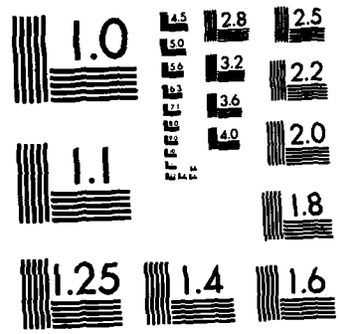
AD-A123 315 PROPELLANT SURVEILLANCE REPORT LGM-30 F & G STAGE 1- 1/2
PHASE G SERIES I TP-H.. (U) OGDEN AIR LOGISTICS CENTER
HILL AFB UT PROPELLANT ANALYSIS LA.. J A THOMPSON
UNCLASSIFIED NOV 82 MANPA-476(82) F/G 21/9.2 NL





HEADQUARTERS

OGDEN AIR LOGISTICS CENTER

UNITED STATES AIR FORCE

HILL AIR FORCE BASE, UTAH 84056

PROPELLANT SURVEILLANCE REPORT LGM-30 F&G STAGE 1 PHASE G, SERIES I TP-H1011

PROPELLANT ANALYSIS LABORATORY

MANPA REPORT

476(82)

November 1982

MANPA REPORT NR 476(82)

PROPELLANT SURVEILLANCE REPORT
LGM-30F & G STAGE I (TP-H1011)

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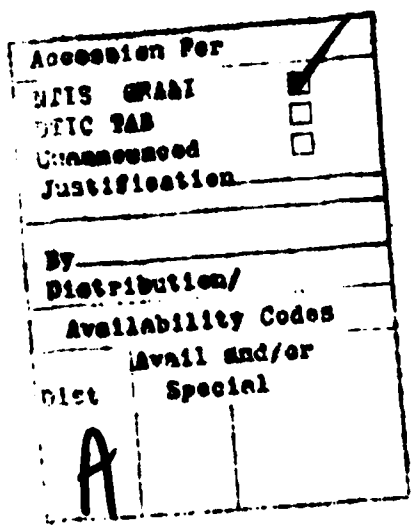
ABSTRACT

This report contains propellant test results from cartons of TP-H1011 bulk propellant representing LGM-30F and G First Stage Minuteman Motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMWRBA Project M34929C.

The data from this test period are combined with data from previous testing and entered into the G085 Computer for storage, analysis, and regression analysis. From the statistical analysis of all data tested to date (sixteen years for F & G), significant degradation of the propellant does not appear likely for at least two years past the oldest data point.

Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the G085 System.



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29A	Test Report (Missile in silo)	13 Jan 64
29B	Zero Time Test Results	29 Jan 64
29C	Zero Time Test Results (Supplement 1)	30 Mar 64
29D	Zero Time Test Results (Aft Closure)	9 Jun 64
29E	Zero Time (Aft Closure Supplement 1)	24 Jun 64
29F	ATP Phase I Test Results	30 Mar 65
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32B	Zero Time, Wings II-V Test Results (Aft Closure)	18 Mar 65
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61	ATP Phase I, Wings II-V (Fifth Group)	10 Jun 66
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280	Surveillance Report LGM-30 A & B Stage I (TP-H1011)	Nov 73
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290	Propellant Surveillance Report LGM-30 F & G, Stage I, Phase B, Series I TP-H1011	Mar 74
300	Minuteman Stage I Motor Reliability Improvement Program Surveillance	May 74

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Report Nr	Title	Report Date
302	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Nov 74
313	Stage 1 Propellant Surveillance Report, Propellant Containing Glacial Acrylic Acid	Oct 74
315	Propellant Surveillance Report LGM-3(F & G Stage 1, TP-H1011	Jan 75
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319	Propellant Surveillance Report LGM-30 Dissected Motors, Phase VI, TP-H1011	Apr 75
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325	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Jun 75
328	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Sep 75
330	Propellant Surveillance Report LGM-30 F & G Stage 1, TP-H1011	Oct 75
335	Stage 1 Motor Reliability Improvement Program	Dec 75
337	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1043	Feb 76
339	Stage 1, New MAPO & ERL-510 Qualification	Mar 76
341	Propellant Surveillance Report LGM-30 Dissected Motors, Phase VII, TP-H1011	Mar 76

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343	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1011	Jun 76
345	Propellant Surveillance Report LGM-30 F & G, Stage 1 Phase B, Series III, TP-H1011	Jun 76
350	Qualification of a New MAPO Source and ERL-510 Curing Agent for Minuteman, Stage 1, UF-2121 Liner	Sep 76
351	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1011	Sep 76
354	Minuteman Stage 1 Motor Reliability Improvement Program Surveillance	Sep 76
358	Propellant Surveillance Report LGM-30 Dissected Motors, Phase VIII, TP-H1011	Oct 76
360	Propellant Surveillance Report LGM-30 F & G, Stage 1 Phase E, Series III, TP-H1011	Nov 76
367	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1011	Apr 77
370	Propellant Surveillance Report LGM-30 F & G, Stage 1, Phase E, Series II, TP-H1011	Apr 77
377	Qualification of a New MAPO Source and ERL-510 Curing Agent for Minuteman Stage 1, UF-2121 Liner	Oct 77
379	Final RIP Report, Minuteman Stage 1 Motor Reliability Improvement Program Surveillance	Oct 77
385	Propellant Surveillance Report LGM-30 A, B, F, & G, Stage 1, TP-H1043	Dec 77
388	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Jan 78
390	Propellant Surveillance Report LGM-30 F & G Stage 1, Phase E, Series IV, TP-H1011	Feb 78
392	Propellant Surveillance Report LGM-30 Dissected Motors, Phase IX, TP-H1011	Mar 78
393	Propellant Surveillance Report LGM-30 A & B Stage I, TP-H1011	May 78

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Report Nr	Title	Report Date
396	Propellant Surveillance Report LGM-30 F & G Stage I, TP-H1011	Jun 78
405	Propellant Surveillance Report LGM-30 F & G Stage I, TP-H1011	Oct 78
406	Propellant Surveillance Report LGM-30 Dissected Motors, Phase X, TP-H1011	Nov 78
416	Propellant Surveillance Report LGM-30 F and G Stage I, TP-H1011	Apr 79
423	Propellant Surveillance Report LGM-30 F and G Stage I, TP-H1011	Oct 79
424	Propellant Surveillance Report LGM-30 Stage I, TP-H1043	Nov 79
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427	Propellant Surveillance Report LGM-30 Dissected Motors, Phase XI, TP-H1011	Nov 79
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445	Propellant Surveillance Report LGM-30 F and G Stage I, TP-H1011	Sep 80
448	Propellant Surveillance Report LGM-30 A and B Stage I, TP-H1011	Nov 80
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462	Propellant Surveillance Report LGM-30 Stage I, TP-H1043	Oct 81
465	Propellant Surveillance Report LGM-30 F and G Stage I, TP-H1011	Feb 82
470	Propellant Surveillance Report LGM-30 Dissected Motors, Phase XIII, TP-H1011	May 82

GLOSSARY OF TERMS AND ABBREVIATIONS

Aging Trend	A change in properties or performance resulting from aging of material or component
CSA	Cross Sectional Area
DB	Dogbone
Degradation	Gradual deterioration of properties or performance
E	Modulus (psi), defined as stress divided by strain along the initial linear portion of the curve.
EB	End Bonded
EGL	Effective Gage Length
em	Strain at maximum stress
er	Strain at rupture
"F" ratio	The ratio of the variance accounted for by the regression function to the random unexplained variance. The regression function having the most significant "F" ratio is used for plotting data. The ratio is also used in detecting significant changes in random variation between succeeding time points
JANNAF	Joint Army, Navy, NASA, Air Force Committee
MANPA	Propellant Lab Section at Ogden Air Logistics Center
Ogden ALC	Ogden Air Logistics Center, Air Force Logistics Command
r or R	The Correlation Coefficient is a measure of the degree of closeness of the linear relationship between two variables
Linear Regression Equation	The general form of the linear regression equation is $Y = a + bx$
Regression Line	Line representing mean test values with respect to time
S_b	Standard error of estimate of the regression coefficient

GLOSSARY OF TERMS AND ABBREVIATIONS (cont)

S_e or $S_{Y.X}$	Standard deviation of the data about the regression line
Sm	Maximum Stress
Sr	Stress at rupture
Standard Deviation (S_y)	Square root of variance
Strain Rate	Crosshead speed divided by the EGL
"t" test	A statistical test used to detect significant differences between a measured parameter and an expected value of the parameter (determines if regression slope differs from zero at the 95% confidence level)
Variance	The sum of squares of deviations of the test results from the mean of the series after division by one less than the total number of test results
3 Sigma Band	The area between the upper and lower 3 sigma limit. It can be expected that 99.73% of the inventory represented by the test samples would fall within this range assuming that the population is normally distributed.
90-90 Band	It can be stated with 90% confidence that 90% of the inventory represented by the test samples would fall within this range assuming that the population is normally distributed
Significant	As used in the statistical sense, means a difference unlikely to have been the result of random sampling from some specified population.

INTRODUCTION

A. PURPOSE:

Laboratory testing has been performed for sixteen years on First Stage LGM-30F and G Minuteman Motor Propellant blocks to evaluate the effects of aging on TP-H1011 propellant. This report contains those tests conducted on propellant as instructed in MMWRBA Test Directive GTD-1C, Amendment 2, LGM-30 First Stage Operational Propellant Laboratory testing.

Statistical analysis of the data from tests performed will provide early warning if serious degradation trends develop. Annual evaluation of the propellant provides data for input into engineering reliability analysis for service life predictions.

B. BACKGROUND:

LGM-30F and G testing was started in 1966 with phase testing at 24 month intervals (Report Numbers 78 - Zero time; 104, 162, 185 - Phase1; 176, 239, 257 - Phase II; 271 - Phase III). Report number 257 was the first time that LGM-30F and G data were statistically analyzed separately from LGM-30 A and B data. The present report is a continuation of testing and statistical analysis.

Zero time testing for LGM-30 A, B, F and G was started as soon as possible after receipt of the propellant by MANPA. Data from these tests were used to establish a baseline for each test parameter.

The LGM-30F and G propellant test matrix (Table 1) is used to determine the number of specimens to be taken from each propellant loaf and the specific test or tests to which these specimens are to be subjected. Very low rate and low rate tensile specimens are taken on all LGM-30F and G blocks. Specimens for other physical and combustion tests are taken from every third LGM-30F and G block.

TABLE 1

SAMPLE PLAN

The Procedure for determining tests to be performed on propellant batch samples of LGM-30 F & G First Stage Motors are as follows:

1. Divide the USAF motor serial numbers into three groups by dividing the last three digits of each serial number by three to determine the remainder integer, e.g., 154 ÷ 3 = 51 with a remainder integer of 1.

2. Use the remainder integer to enter the following matrix to determine the group of tests to be performed on the forward, middle, and aft batch samples associated with a particular motor serial number.

GROUP MATRIX

TP-H1011 PROPELLANT BATCH SAMPLE	GROUP I	GROUP II	GROUP III
Forward	1	2	0
Middle	0	1	2
Aft	2	0	1

Each group will receive the following tests:

TEST MATRIX

GROUP I	GROUP II	GROUP III
High Rate Triaxial	Dynamic Response	High Rate Hydrostatic
Creep	Stress Relaxation	Sol Gel
Biaxial Low Rate	Burning Rate	DSC
TCLE	Heat of Explosion	TGA
Hardness	Pressure Time	DTA
Ignitability		Impact

NOTE: Low Rate and Very Low Rate Tensile tests are performed on all blocks.

STATISTICAL APPROACH

In order to determine aging trends for shelf/service life predictions, as directed by Service Engineering, First Stage LGM-30 F and G Minuteman TP-H1011 propellant blocks have been undergoing testing since 1966, statistically analyzed and reported on a regular test cycle by this laboratory.

The primary reason for performing statistical analysis on test data is for the detection of propellant changes due to aging that would affect motor reliability. Regression analysis was the method used to examine data and to aid in drawing conclusions about dependency relationships that may exist i.e., relationship between age versus test results.

In selecting the best fit model for the regression equation, the linear model $Y = a + bX$ was found to be the best fit model for the regression plots.

Individual data points from different time periods were used to establish a least squares trend line for the data. The variance about the regression line, obtained using individual values of the dependent variable, was used to compute a tolerance interval such that at the 90% confidence level 90% of the sample distribution falls within this interval. This tolerance interval was extrapolated to a maximum of 24 months into the future from age of the oldest motor tested. The 't' value and the significance of this statistic, which are reported for each regression model, give an indication of the "statistical significance" of the slope of the trend line as compared to a line of zero slope. When a regression slope is indicated to be significant, it should be noted that the slope of the regression line is significant from a statistical standpoint and it is an indication that a change over time is occurring, but does not necessarily mean that the indicated change in the

value obtained during testing is significant in regards to motor operational performance. In a few cases, this small change has become the apparent trend in data variance and regression line trends. However, the changes are gradual and no operational problems are expected at this time.

The data were plotted by computer. The 'y' axis is computed so that the values at one inch intervals are peculiar to the data spread of the parameter tested. Plotted data points represent means at the particular ages at which testing occurred. The number of specimens at each age point is indicated on the sample size summary sheet accompanying the regression plot. Variance at each test age can be determined by consulting the G085 data storage system.

A regression summary of all test parameters is included in Table 2. The direction of the regression trend lines are also indicated in Table 2. The slopes that are "statistically" not significant from a line of zero slope are labeled as such and are not included in this report.

TEST RESULTS

VERY LOW RATE TENSILE:

Very low rate regressions show a statistically significant decrease for strain at maximum stress and strain at rupture. The stresses and modulus show a statistically significant increase (Figures 1 thru 5). The trends are gradual for the respective regressions and no operational problems from the propellant are expected for at least two years beyond the last test date.

LOW RATE BIAXIAL TENSILE:

The strain at maximum stress regression shows no significant trend direction with the strain at rupture showing a statistically significant decrease. The stresses and modulus show a statistically significant increase (Figures 6 thru 9).

LOW RATE TENSILE:

Low rate tensile regressions show a statistically significant gradual decrease for strains and a statistically significant increase for stresses and modulus (Figures 10 thru 14).

HIGH RATE TRIAXIAL TENSILE:

The strain at maximum stress, strain at rupture and modulus regressions show a statistically significant decrease. Maximum stress shows a statistically significant increase. Stress at rupture shows no significant trend direction (Figures 15 thru 18).

HIGH RATE HYDROSTATIC TENSILE:

The strains show a statistically significant decrease. The stresses and modulus show a statistically significant increase (Figures 19 thru 23).

TEAR ENERGY:

The cohesive energy tested at 180°F and a CHS of 0.002 in/min shows a non significant trend direction.

TENSILE SUMMARY:

The test data regressions show that the strain is gradually decreasing and the stress and modulus are gradually increasing.

Based on the analysis of test data regressions, it does not appear that meaningful degradation is occurring at this time and no operational problems are expected in the propellant for at least two years beyond the last data point.

STRESS RELAXATION MODULUS:

For the 0.5% strain at -65°F, the regressions for data at 10, 50, 100, and 1000 seconds show a statistically significant increase (Figures 24 thru 27).

At -40°F, the 10, 50, and 100 second regressions show a statistically significant increase. The 1000 second regression shows a statistically significant decrease (Figures 28 thru 31).

The 3% strain regressions at 20°F, 77°F, 100°F, 140°F, and 180°F all show a statistically significant increase (Figures 32 thru 51).

SOL GEL:

The % extractables and density slopes are not significant when compared with a line of zero slope. The gel swell ratio and crosslink density regressios show a statistically significant increase (Figures 52 and 53).

CONSTANT STRAIN:

A statistically significant decreasing trend is shown (Figure 54).

HARDNESS:

Shore A 10 second hardness shows a statistically significant increasing trend (figure 55).

SUMMARY OF SOL GEL, TENSILE, AND HARDNESS DATA:

The crosslink density, constant strain, and hardness data regressions correlate well with the tensile data. As the polymer continues to crosslink, the strains decrease and the stresses increase.

TCLE (Thermal Coefficient of Linear Expansion):

The TCLE for both above and below the glass transition point (Tg) shows a statistically significant increasing trend (Figures 56 and 57).

TGA (Thermal Gravimetric Analysis):

A statistically significant increase is shown for the ignition temperature (9°C rise/min), and weight loss at ignition. No significant trend direction was observed for wieght loss at 250°C hold (12°C rise/min to hold), (Figures 58 and 59).

DTA (Differential Thermal Analysis):

The endotherm and first and second exotherms show a statistically significant decreasing trend direction. The third exotherm and ignition temperature shows a statistically significant increasing trend direction (Figures 60 thru 64).

BURNING RATE:

The burning rate shows a statistically significant increasing trend (Figure 65).

THERMAL AND COMBUSTION SUMMARY:

From the analyses of the regressions, no combustion problems are expected for at least two years beyond the oldest data point.

CONCLUSIONS

Sixteen years of aging at ambient temperature (77°F) has not greatly changed the properties of the propellant. Some test parameters indicate slight aging trends, but nothing that would adversely affect the operational characteristics of the rocket motor propellant.

From the statistical analysis, it does not appear that significant propellant degradation is occurring. Based on sixteen years of accumulated data, there is no reason to suspect that properties will show much change for at least two years past the last data point. Therefore, propellant reliability should not change appreciably over that time period. Since failure limits are not available for the parameters tested, this statement is based on the fact that the slope of the regression curves where statistically significant are, with few exceptions, relatively flat or close to a line of zero slope and have not changed appreciably from the last test period.

TABLE 2

Regression Summary

Test Parameter	Slope
Very Low Rate Tensile	
Strain at Maximum Stress	-
Maximum Stress	+
Strain at Rupture	-
Stress at Rupture	+
Modulus	+
Low Rate Biaxial Tensile	
Strain at Maximum Stress	NS
Maximum Stress	+
Strain at Rupture	-
Stress at Rupture	+
Modulus	+
Low Rate Tensile	
Strain at Maximum Stress	-
Maximum Stress	+
Strain at Rupture	-
Stress at Rupture	+
Modulus	+
High Rate Triaxial Tensile	
Strain at Maximum Stress	-
Maximum Stress	+
Strain at Rupture	-
Stress at Rupture	NS
Modulus	-
High Rate Hydrostatic Tensile	
Strain at Maximum Stress	-
Maximum Stress	+
Strain at Rupture	-
Stress at Rupture	+
Modulus	+
Tear Energy	
Stress Relaxation	
-65^{o}, 10 sec	+
-65^{o}, 50 sec	+
-65^{o}, 100 sec	+
-65^{o}, 1000 sec	+
-40^{o}, 10 sec	+
-40^{o}, 50 sec	+
-40^{o}, 100 sec	+
-40^{o}, 1000 sec	-

TABLE 2 (cont)

Regression Summary

Test Parameter	Slope
+20°, 10 sec	+
+20°, 50 sec	+
+20°, 100 sec	+
+20°, 1000 sec	+
+77°, 10 sec	+
+77°, 50 sec	+
+77°, 100 sec	+
+77°, 1000 sec	+
+100°, 10 sec	+
+100°, 50 sec	+
+100°, 100 sec	+
+100°, 1000 sec	+
+140°, 10 sec	+
+140°, 50 sec	+
+140°, 100 sec	+
+140°, 1000 sec	+
+180°, 10 sec	+
+180°, 50 sec	+
+180°, 100 sec	+
+180°, 1000 sec	+
Sol Gel	
% Extractables	NS
Density	NS
Gel Swell Ratio	+
Crosslink Density	+
Constant Strain	-
Hardness, Shore A, 10 sec	+
Pressure Time	
Not tested due to equipment problems	
TCLE	
Above T_g	+
Below T_g	+
TGA	
Ignition Temperature	+
% Weight Loss at 250°	NS
% Weight Loss at Ignition	+

TABLE 2 (cont)

Regression Summary

Test Parameter	Slope
DTA	
Endotherm 1	-
Exotherm 1	-
Exotherm 2	-
Exotherm 3	+
Ignition Temperature	+
Burn Rate, 1000 psi	+

NS = Not Significant
- = Negative Slope
+ = Positive Slope

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	33	152	58	352	83	80	108	93	133	84
9	19	34	154	59	317	84	56	109	129	134	126
10	11	35	113	60	418	85	76	110	72	135	69
11	15	36	226	61	290	86	92	111	42	136	51
12	30	37	147	62	337	87	122	112	144	137	99
13	48	38	126	63	243	88	139	113	309	138	259
14	28	39	115	64	160	89	177	114	167	139	163
15	38	40	122	65	111	90	156	115	133	140	81
16	46	41	156	66	85	91	107	116	327	141	40
17	55	42	123	67	54	92	91	117	250	142	48
18	28	43	142	68	179	93	126	118	149	143	206
19	49	44	106	69	246	94	99	119	133	144	103
20	24	45	135	70	289	95	161	120	219	145	12
21	56	46	122	71	145	96	203	121	126	146	24
22	27	47	166	72	130	97	170	122	41	147	30
23	67	48	177	73	110	98	189	123	48	148	40
24	55	49	199	74	155	99	221	124	48	149	12
25	63	50	188	75	198	100	178	125	84	150	27
26	47	51	353	76	156	101	175	126	53	151	60
27	50	52	320	77	167	102	51	127	110	152	9
28	56	53	298	78	91	103	68	128	60	153	8
29	40	54	247	79	117	104	84	129	75	154	27
30	73	55	480	80	113	105	33	130	184	155	21
31	88	56	470	81	155	106	44	131	215	156	23
32	153	57	392	82	178	107	31	132	156	157	12

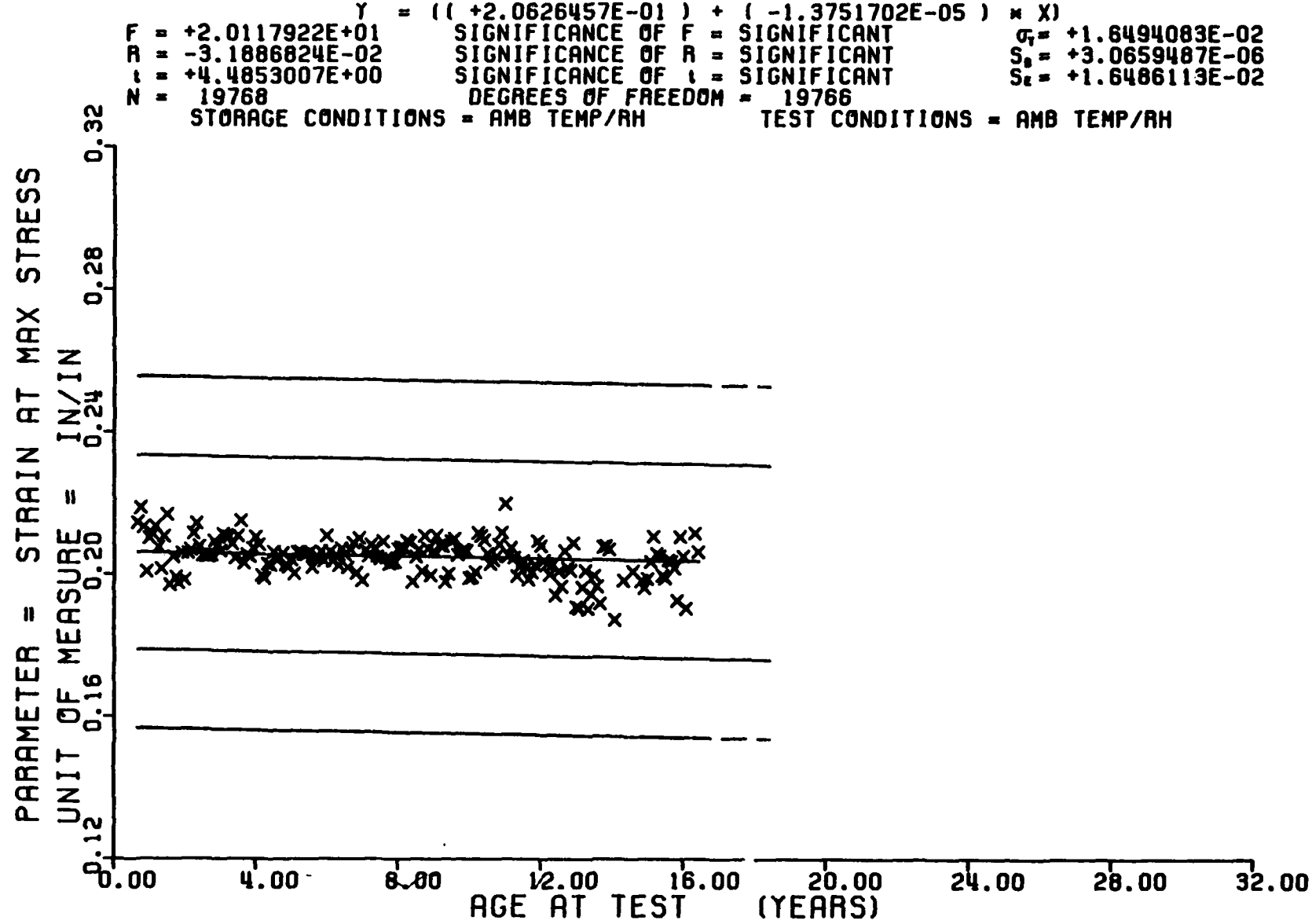
WING 6.V.L.R.TENSILE.STRAIN AT MAX STRESS.CHS=0.002 IN/MIN TP-H1011

This sample size summary is applicable to figures 1 thru 5.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
158	21	189	35
159	28	190	17
160	9	191	23
161	33	192	37
162	18	193	6
163	24	196	9
164	3	197	12
165	18		
166	18		
167	20		
169	18		
171	3		
172	11		
175	18		
178	9		
179	18		
180	24		
181	15		
182	19		
183	18		
184	12		
185	33		
186	9		
187	46		
188	57		

WING 6.V.L.R.TENSILE.STRAIN AT MAX STRESS.CHS=0.002 IN/MIN TP-H1011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R = -3.1886824E-02 SIGNIFICANCE OF R = SIGNIFICANT Sb = +3.0659487E-06
t = +4.4853007E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +1.6486113E-02
N = 19768 DEGREES OF FREEDOM = 19766
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.32
0.28
0.24
0.20
0.16
0.12
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,V.L.R.TENSILE,STRAIN AT MAX STRESS,CHS=0.002 IN/MIN TP-H1011

Figure 1

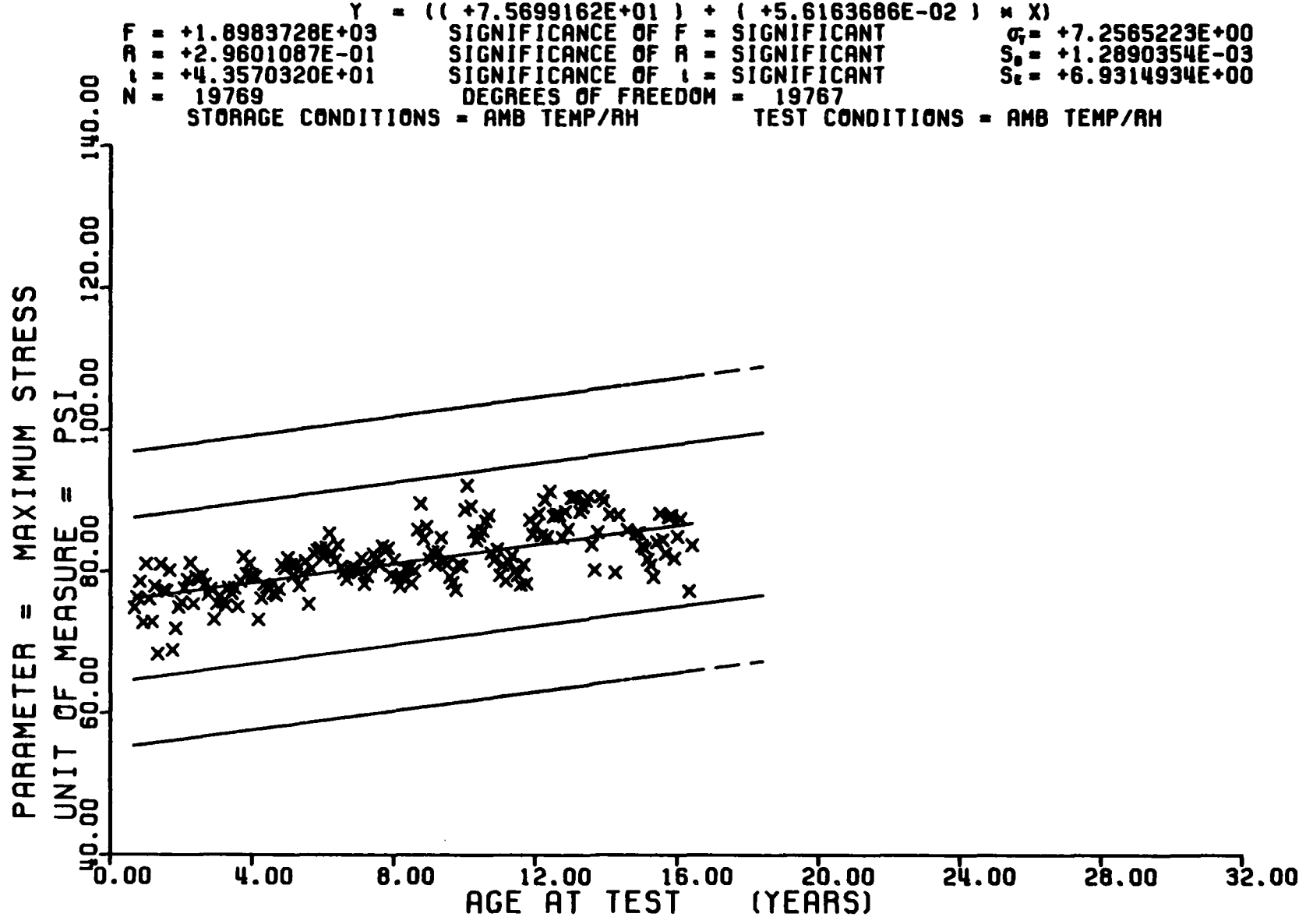

Y = ((+7.5699162E+01) + (+5.6163686E-02) * X)
F = +1.8983728E+03 SIGNIFICANCE OF F = SIGNIFICANT
R = +2.9601087E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +4.3570320E+01 SIGNIFICANCE OF t = SIGNIFICANT
N = 19769 DEGREES OF FREEDOM = 19767
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σt = +7.2565223E+00
Se = +1.2890354E-03
St = +6.9314934E+00
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
140.00
120.00
100.00
80.00
60.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,V.L.R.TENSILE,MAXIMUM STRESS,CHS=0.002 IN/MIN TP-H1011

Figure 2

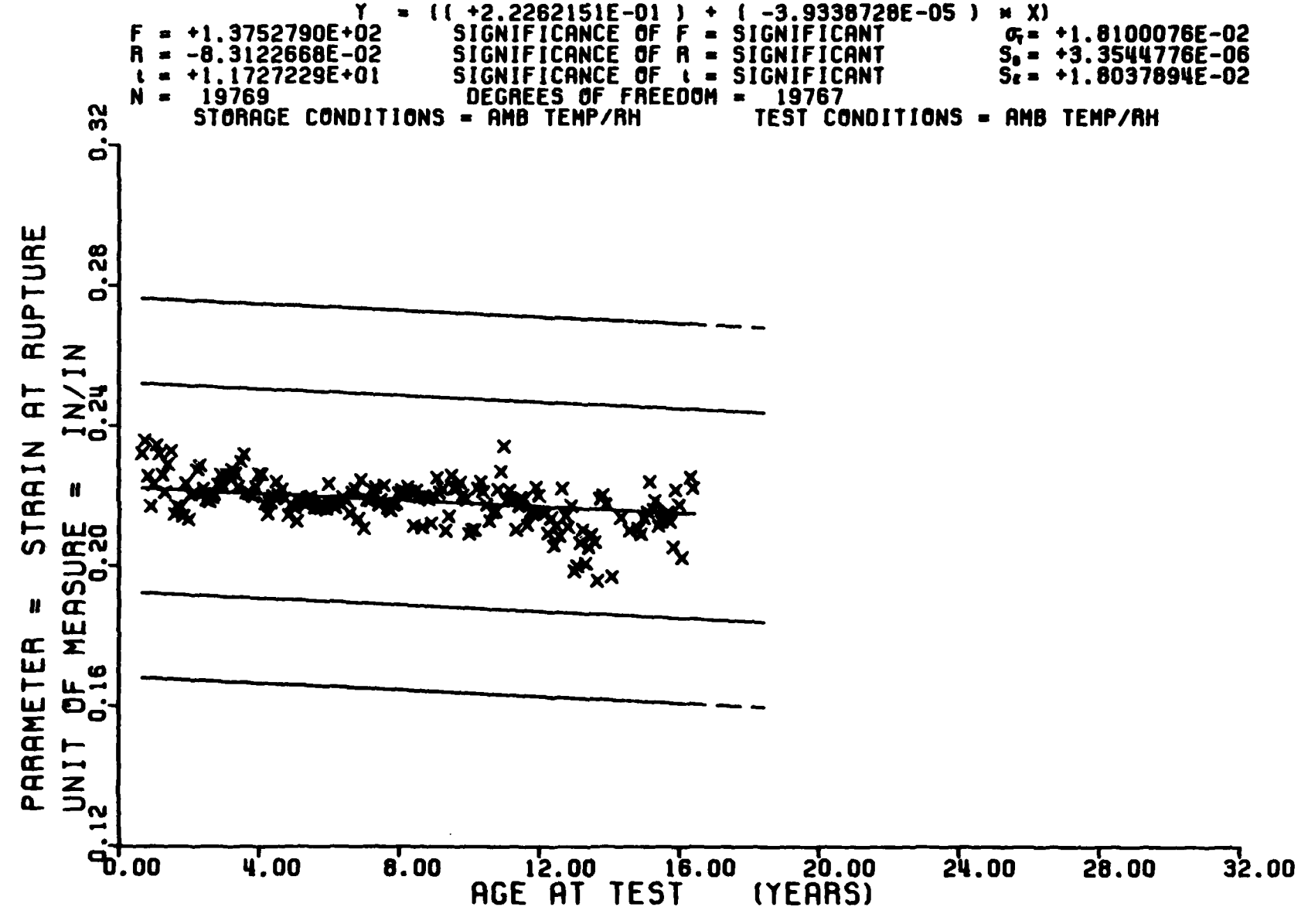
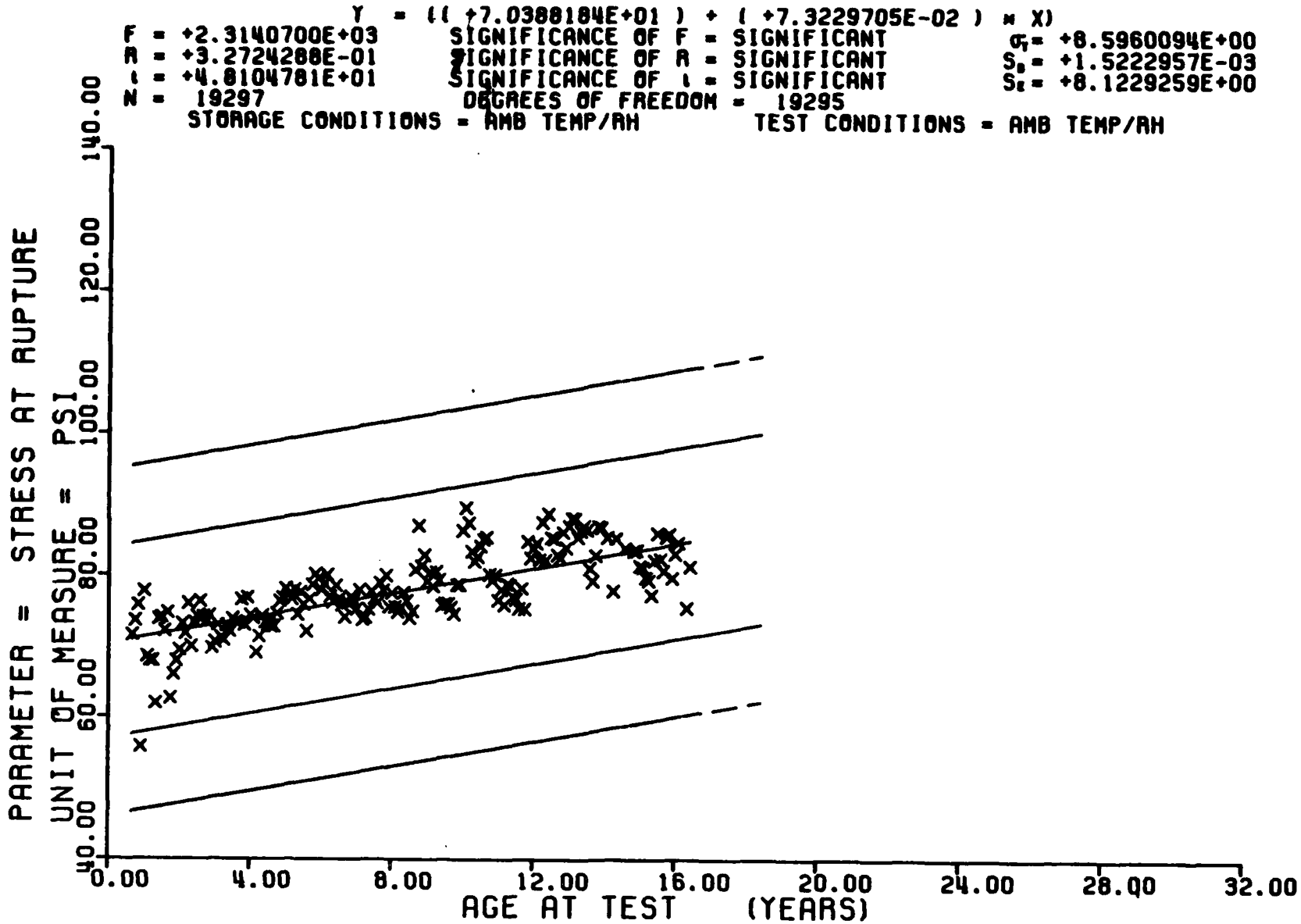

Y = ((+2.2262151E-01) + (-3.9338728E-05) * X)
F = +1.3752790E+02 SIGNIFICANCE OF F = SIGNIFICANT σt = +1.8100076E-02
R = -8.3122668E-02 SIGNIFICANCE OF R = SIGNIFICANT Sb = +3.3544776E-06
t = +1.1727229E+01 SIGNIFICANCE OF t = SIGNIFICANT Sε = +1.8037894E-02
N = 19769 DEGREES OF FREEDOM = 19767
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.12
0.16
0.20
0.24
0.28
0.32
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,V.L.R.TENSILE,STRAIN AT RUPTURE,CHS=0.002 IN/MIN TP-H1011

Figure 3



WING 6,V.L.R.TENSILE,STRESS AT RUPTURE,CHS=0.002 IN/MIN TP-H1011

Figure 4

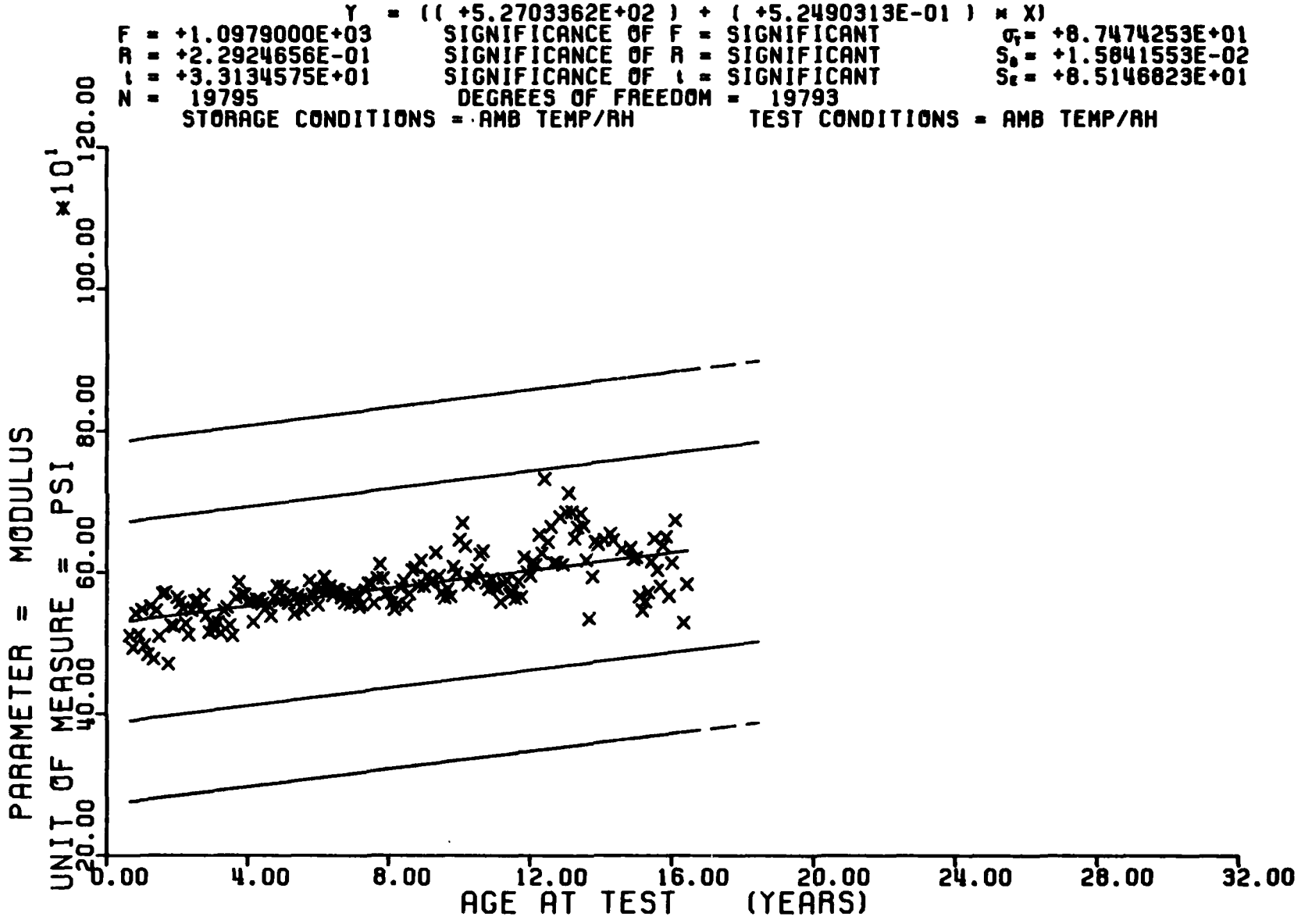

Y = ((+5.2703362E+02) + (+5.2490313E-01) * X)
F = +1.0979000E+03 SIGNIFICANCE OF F = SIGNIFICANT σt = +8.7474253E+01
R = +2.2924656E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.5841553E-02
t = +3.3134575E+01 SIGNIFICANCE OF t = SIGNIFICANT Se = +8.5146823E+01
N = 19795 DEGREES OF FREEDOM = 19793
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10¹
120.00
100.00
80.00
60.00
40.00
20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,V.L.R.TENSILE,MODULUS,CHS=0.002 IN/MIN TP-H1011

Figure 5

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	1	33	22	58	40	83	16	108	14	135	18
8	2	34	26	59	31	84	10	109	22	136	4
9	4	35	26	60	45	85	6	110	27	137	17
11	6	36	34	61	35	86	7	111	10	138	60
12	14	37	14	62	57	87	8	112	10	139	38
13	22	38	11	63	54	88	10	113	19	140	10
14	4	39	28	64	42	89	8	114	68	141	8
15	16	40	16	65	18	90	6	115	21	142	6
16	12	41	14	66	29	91	15	116	50	143	26
17	14	42	8	67	36	92	12	117	68	144	43
18	16	43	2	68	36	93	17	118	34	145	6
19	14	44	5	69	36	94	35	119	32	146	8
20	16	45	4	70	55	95	36	120	45	147	4
21	12	46	10	71	21	96	48	121	32	148	2
22	10	47	16	72	28	97	53	122	10	149	6
23	13	48	24	73	32	98	72	123	2	150	6
24	16	49	34	74	40	99	56	125	12	151	8
25	25	50	26	75	43	100	40	127	10	152	5
26	22	51	38	76	18	101	31	128	5	154	4
27	24	52	51	77	19	102	8	129	8	155	2
28	28	53	49	78	22	103	3	130	24	156	4
29	23	54	28	79	20	104	14	131	80	157	12
30	26	55	36	80	17	105	6	132	26	158	2
31	26	56	38	81	29	106	6	133	12	159	2
32	42	57	40	82	24	107	2	134	22	160	4

WING 6.L.R.BIAXIAL TENSILE.MAXIMUM STRESS.CHS=0.2 IN/MIN TPH-1011

This sample size summary is applicable to figures 6 thru 9.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
161	6	188	10
162	1	189	12
163	4	190	4
165	2	192	4
166	6	193	2
167	4	194	2
169	2	195	2
170	2	198	2
171	2		
172	2		
173	2		
174	4		
175	2		
176	4		
177	3		
178	6		
179	3		
180	8		
181	6		
182	6		
183	6		
184	6		
185	10		
186	14		
187	10		

WING 6.L.R.BIAXIAL TENSILE.MAXIMUM STRESS.CHS=0.2 IN/MIN TPH-1011

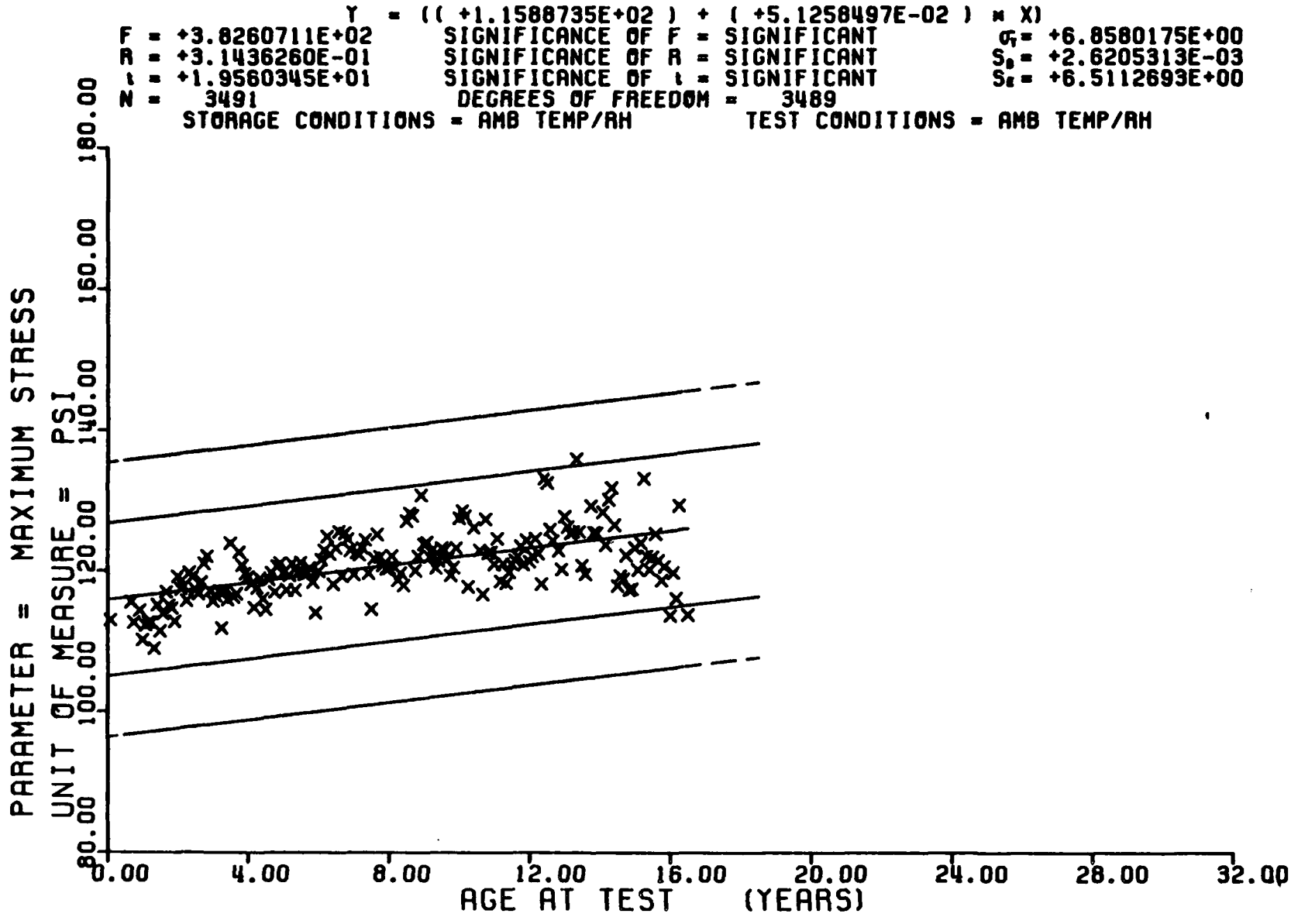
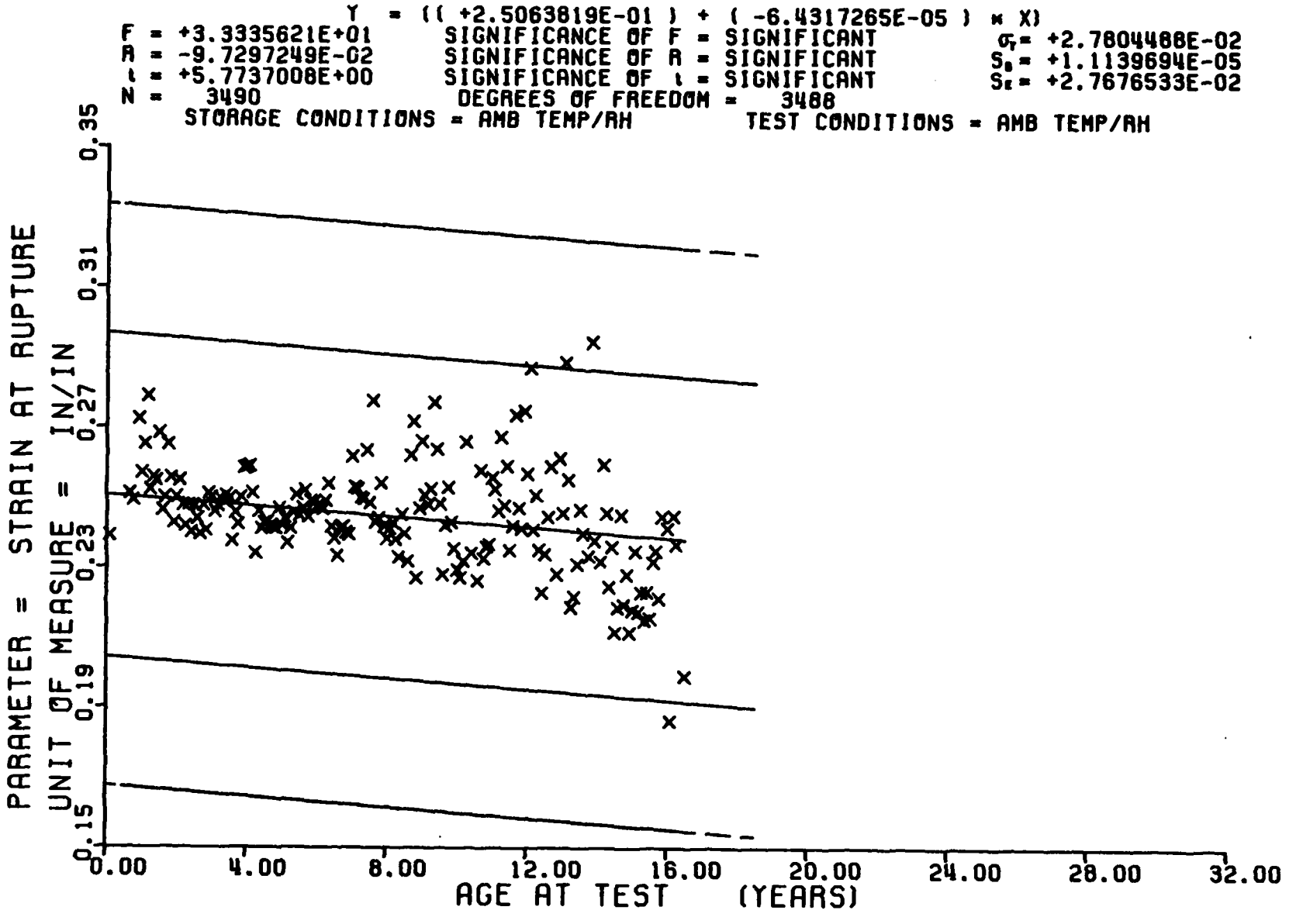

Y = ((+1.1588735E+02) + (+5.1258497E-02) * X)
F = +3.8260711E+02 SIGNIFICANCE OF F = SIGNIFICANT σ1 = +6.8580175E+00
R = +3.1436260E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.6205313E-03
t = +1.9560345E+01 SIGNIFICANCE OF t = SIGNIFICANT Se = +6.5112693E+00
N = 3491 DEGREES OF FREEDOM = 3489
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
180.00
160.00
140.00
120.00
100.00
80.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,L.R.BIAXIAL TENSILE,MAXIMUM STRESS,CHS=0.2 IN/MIN TPH-1011

Figure 6



WING 6,L.R.BIAXIAL TENSILE,STRAIN AT RUPTURE,CHS=0.2 IN/MIN TPH-1011

Figure 7

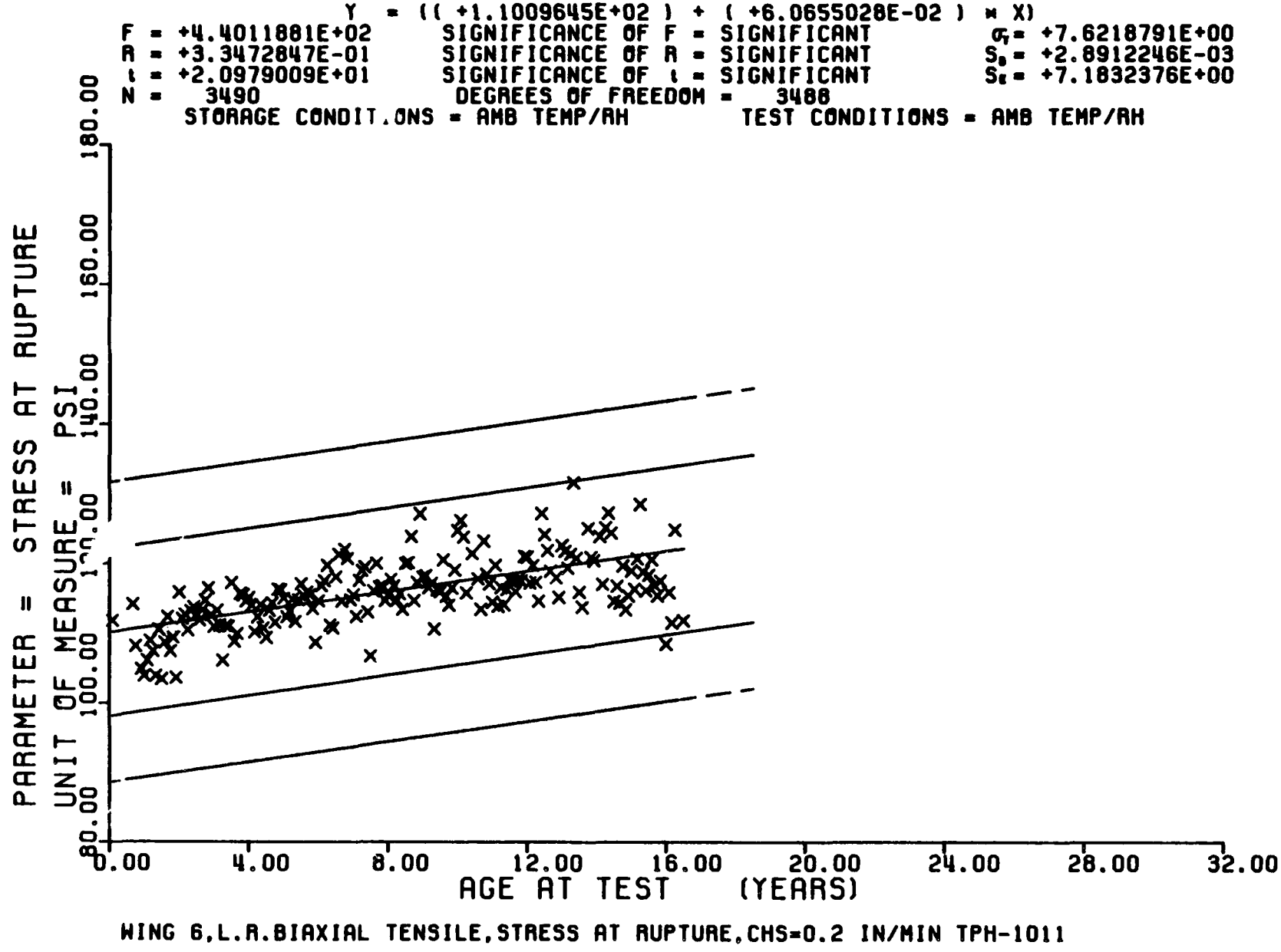
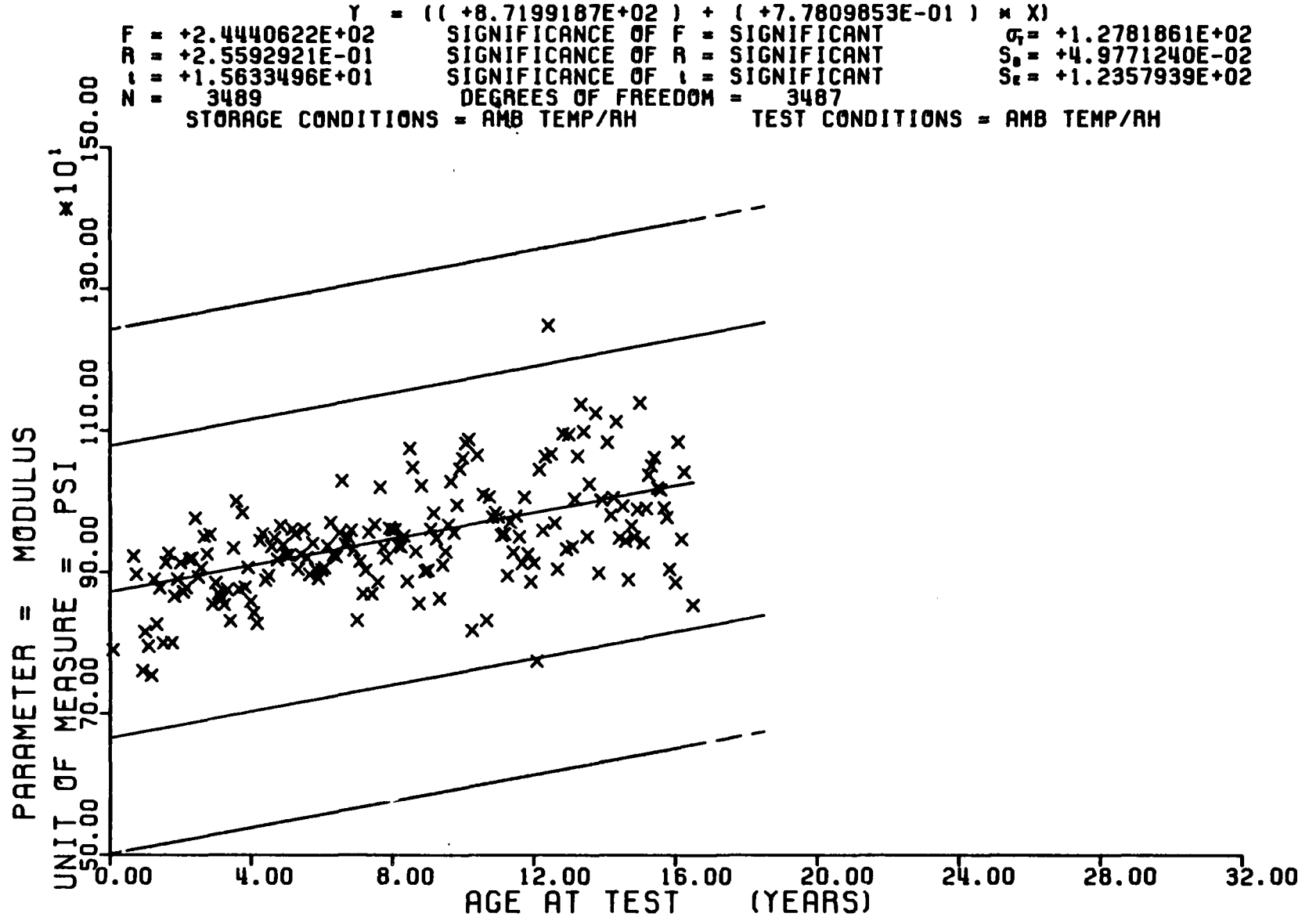

Y = ((+1.1009645E+02) + (+6.0655028E-02) * X)
F = +4.4011881E+02 SIGNIFICANCE OF F = SIGNIFICANT σt = +7.6218791E+00
R = +3.3472847E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.8912246E-03
t = +2.0979009E+01 SIGNIFICANCE OF t = SIGNIFICANT Sε = +7.1832376E+00
N = 3490 DEGREES OF FREEDOM = 3488
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
180.00
160.00
140.00
120.00
100.00
80.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,L.R.BIAXIAL TENSILE,STRESS AT RUPTURE,CHS=0.2 IN/MIN TPH-1011

Figure 8



WING 6,L.R.BIAXIAL TENSILE,MODULUS,CHS=0.2 IN/MIN TPH-1011

Figure 9

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
2	3	28	82	53	100	78	177	103	53	128	74
4	57	29	55	54	95	79	129	104	81	129	51
5	151	30	52	55	152	80	132	105	18	130	264
6	191	31	52	56	113	81	179	106	33	131	150
7	171	32	124	57	172	82	94	107	27	132	55
8	143	33	85	58	158	83	106	108	111	133	69
9	194	34	78	59	134	84	93	109	118	134	111
10	189	35	44	60	159	85	83	110	68	135	50
11	192	36	154	61	189	86	63	111	33	136	45
12	220	37	83	62	218	87	156	112	108	137	102
13	213	38	39	63	283	88	143	113	132	138	270
14	222	39	93	64	134	89	156	114	82	139	165
15	223	40	65	65	78	90	117	115	77	140	43
16	212	41	35	66	67	91	100	116	282	141	44
17	184	42	69	67	110	92	104	117	264	142	87
18	26	43	75	68	110	93	105	118	161	143	232
19	60	44	21	69	166	94	146	119	117	144	36
20	18	45	20	70	191	95	160	120	259	145	24
21	78	46	58	71	114	96	257	121	127	146	42
22	43	47	106	72	163	97	296	122	38	147	21
23	30	48	85	73	165	98	301	123	46	148	18
24	77	49	122	74	202	99	180	124	44	149	23
25	51	50	108	75	259	100	83	125	60	150	38
26	56	51	181	76	167	101	150	126	78	151	35
27	59	52	232	77	154	102	22	127	68	152	15

WING 6.L.R.TENSILE.STRAIN AT MAX STRESS.CHS=2.0 IN/MIN TP-H1011

This sample size summary is applicable to figures 10 thru 14.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
153	3	179	12
154	27	180	55
155	30	181	15
156	25	182	18
157	23	183	42
158	24	184	21
159	21	185	32
160	12	186	65
161	42	187	60
162	12	188	45
163	12	189	40
164	6	190	19
165	6	191	15
166	24	192	9
167	12	193	3
168	19	194	15
169	3	195	3
171	14	197	9
172	6		
173	21		
174	3		
175	18		
176	12		
177	48		
178	21		

WING 6.L.R.TENSILE.STRAIN AT MAX STRESS.CHS=2.0 IN/MIN TP-H1011

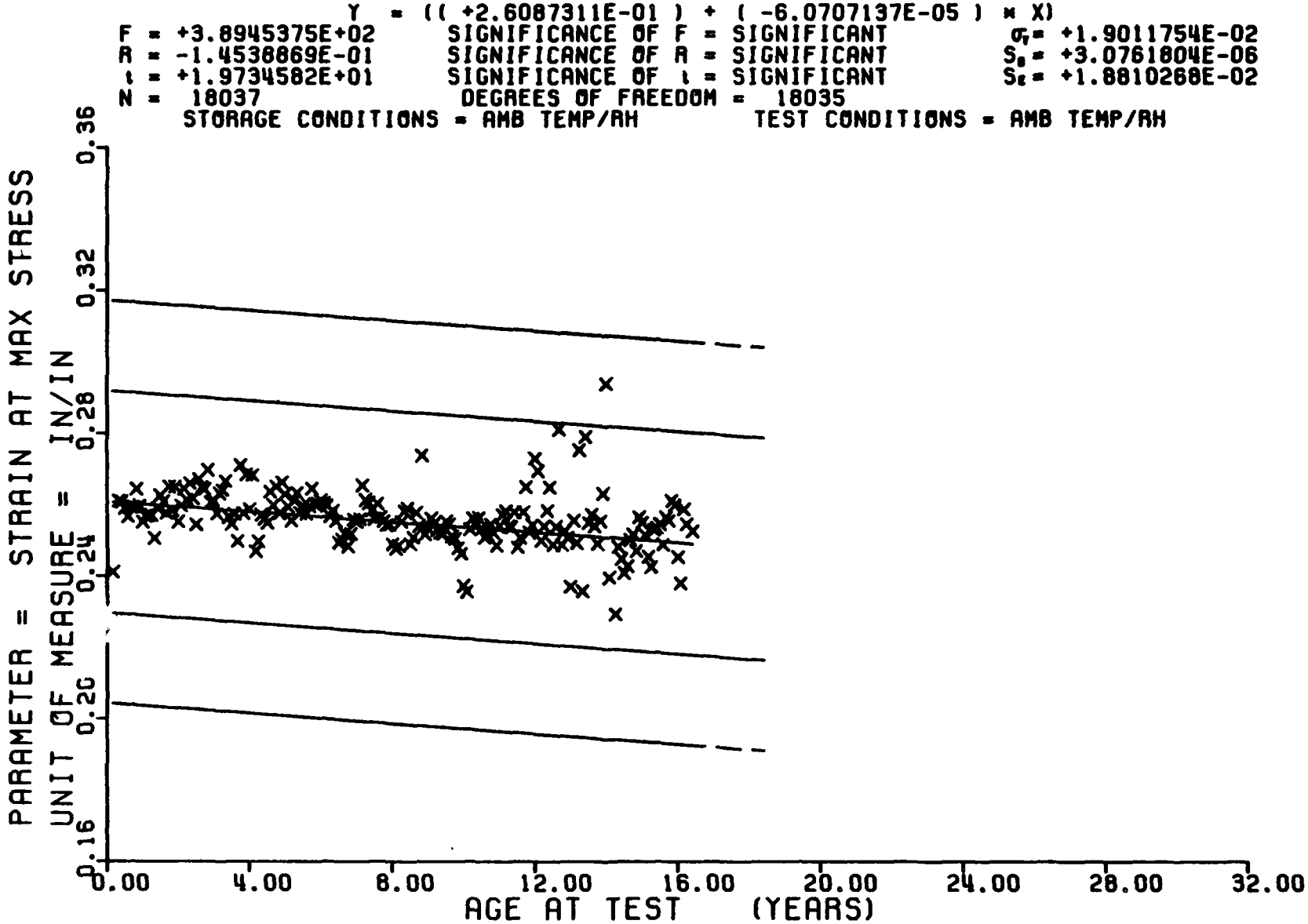

Y = ((+2.6087311E-01) + (-6.0707137E-05) x X)
F = +3.8945375E+02 SIGNIFICANCE OF F = SIGNIFICANT
R = -1.4538869E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +1.9734582E+01 SIGNIFICANCE OF t = SIGNIFICANT
N = 18037 DEGREES OF FREEDOM = 18035
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σt = +1.9011754E-02
Sb = +3.0761804E-06
Sε = +1.8810268E-02
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.36
0.32
0.28
0.24
0.20
0.16
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,L.R.TENSILE,STRAIN AT MAX STRESS,CHS=2.0 IN/MIN TP-H1011

Figure 10

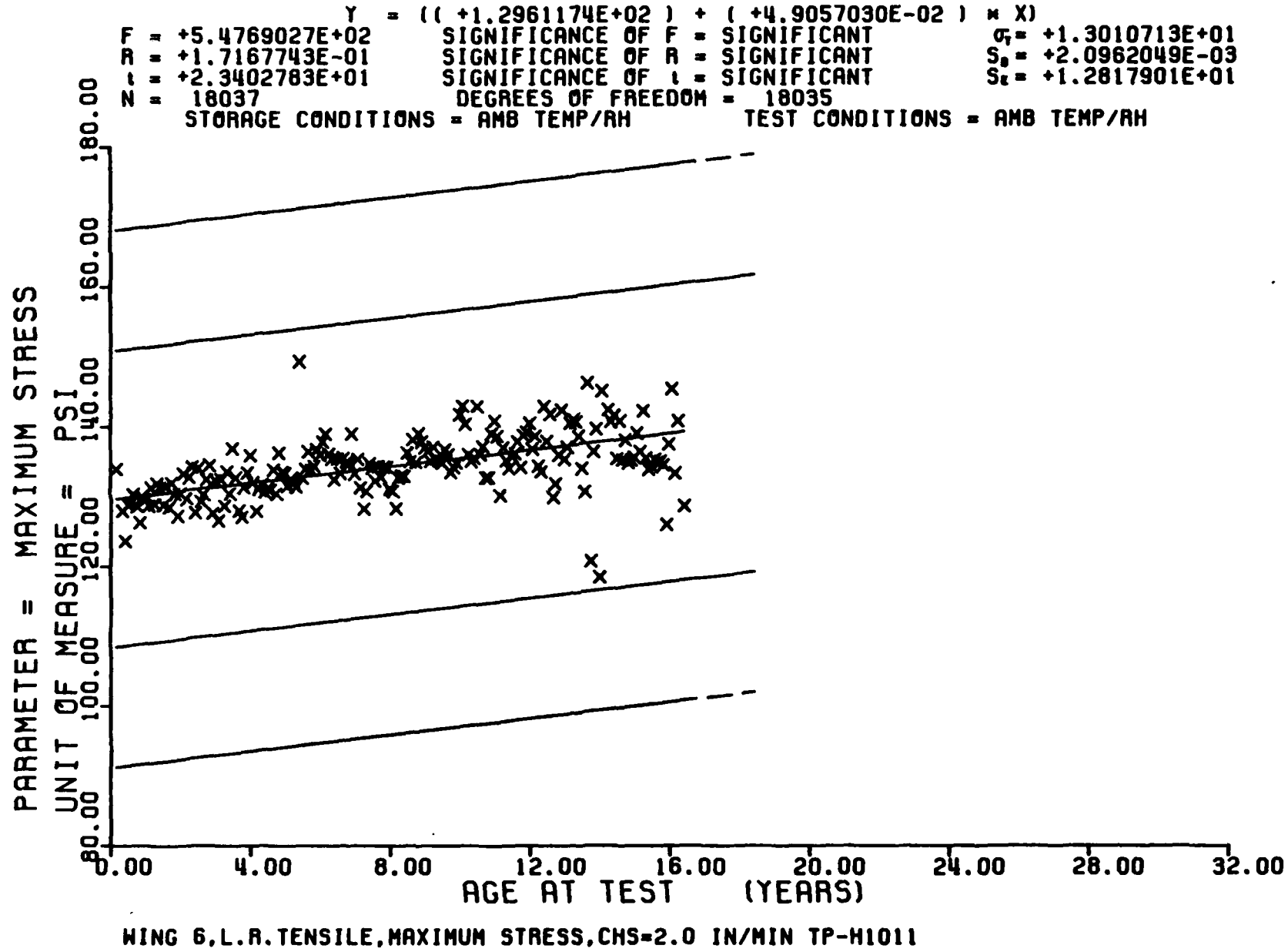

Y = ((+1.2961174E+02) + (+4.9057030E-02) * X)
F = +5.4769027E+02 SIGNIFICANCE OF F = SIGNIFICANT σ_Y = +1.3010713E+01
R = +1.7167743E-01 SIGNIFICANCE OF R = SIGNIFICANT S_B = +2.0962049E-03
t = +2.3402783E+01 SIGNIFICANCE OF t = SIGNIFICANT S_E = +1.2817901E+01
N = 18037 DEGREES OF FREEDOM = 18035
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
80.00
100.00
120.00
140.00
160.00
180.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,L.R.TENSILE,MAXIMUM STRESS,CHS=2.0 IN/MIN TP-H1011

Figure 11

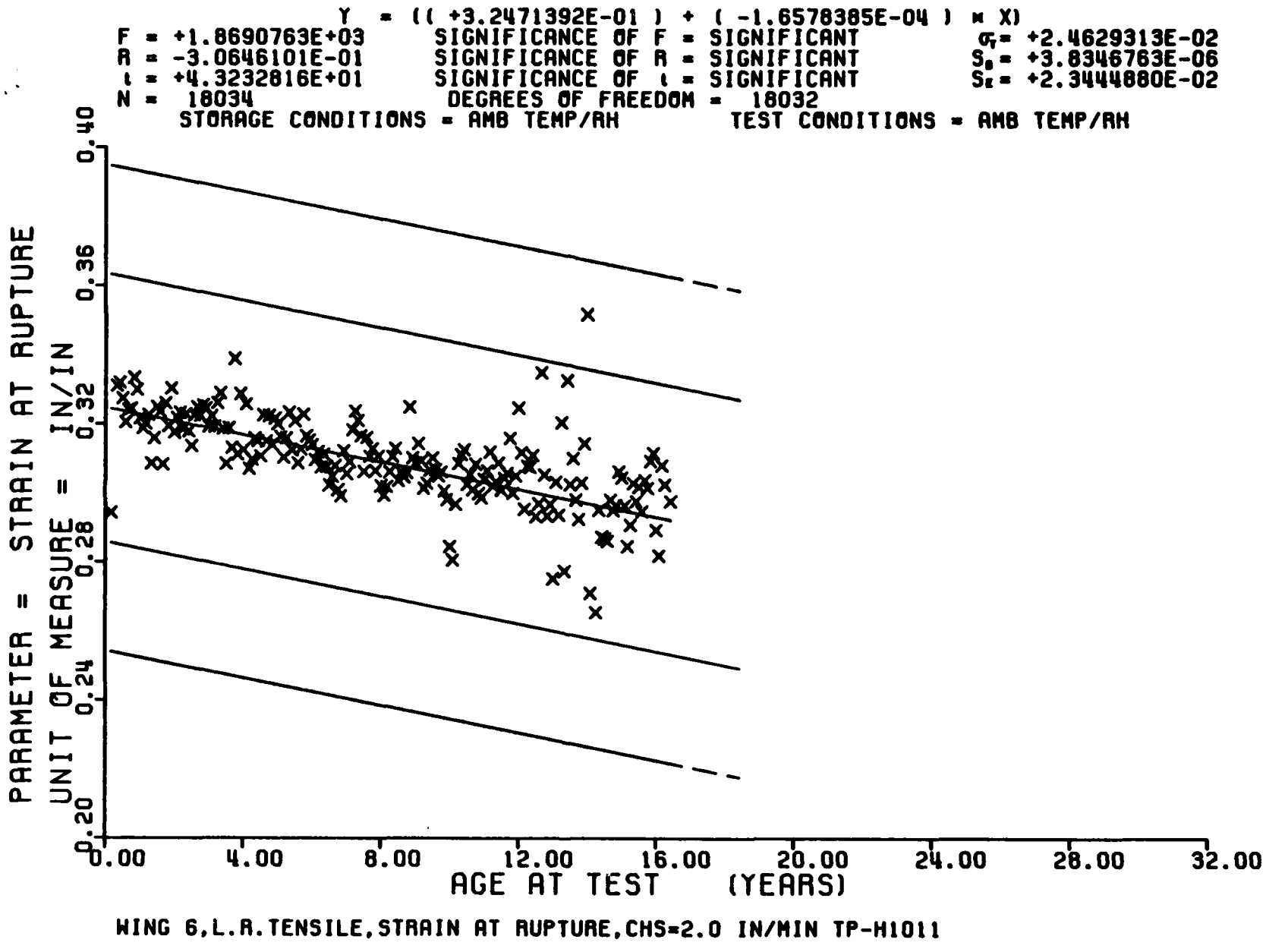

Y = ((+3.2471392E-01) + (-1.6578385E-04) * X)
F = +1.8690763E+03 SIGNIFICANCE OF F = SIGNIFICANT σr = +2.4629313E-02
R = -3.0646101E-01 SIGNIFICANCE OF R = SIGNIFICANT Se = +3.8346763E-06
t = +4.3232816E+01 SIGNIFICANCE OF t = SIGNIFICANT Sz = +2.3444880E-02
N = 18034 DEGREES OF FREEDOM = 18032
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.40
0.36
0.32
0.28
0.24
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,L.R.TENSILE,STRAIN AT RUPTURE,CHS=2.0 IN/MIN TP-H1011

Figure 12

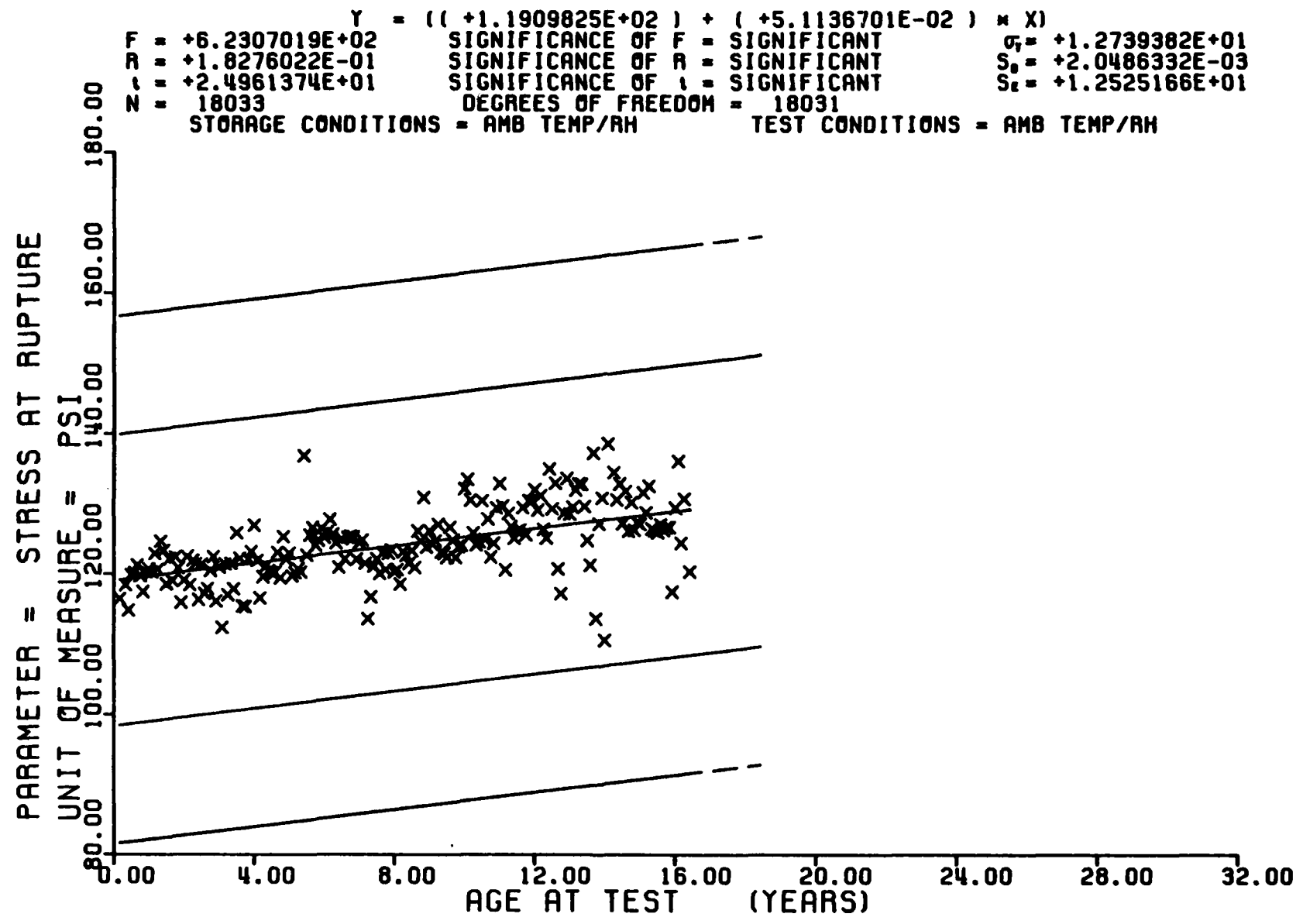

Y = ((+1.1909825E+02) + (+5.1136701E-02) * X)
F = +6.2307019E+02 SIGNIFICANCE OF F = SIGNIFICANT σr = +1.2739382E+01
R = +1.8276022E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.0486332E-03
t = +2.4961374E+01 SIGNIFICANCE OF t = SIGNIFICANT Se = +1.2525166E+01
N = 18033 DEGREES OF FREEDOM = 18031
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
180.00
160.00
140.00
120.00
100.00
80.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,L.R.TENSILE,STRESS AT RUPTURE,CHS=2.0 IN/MIN TP-H1011

Figure 13

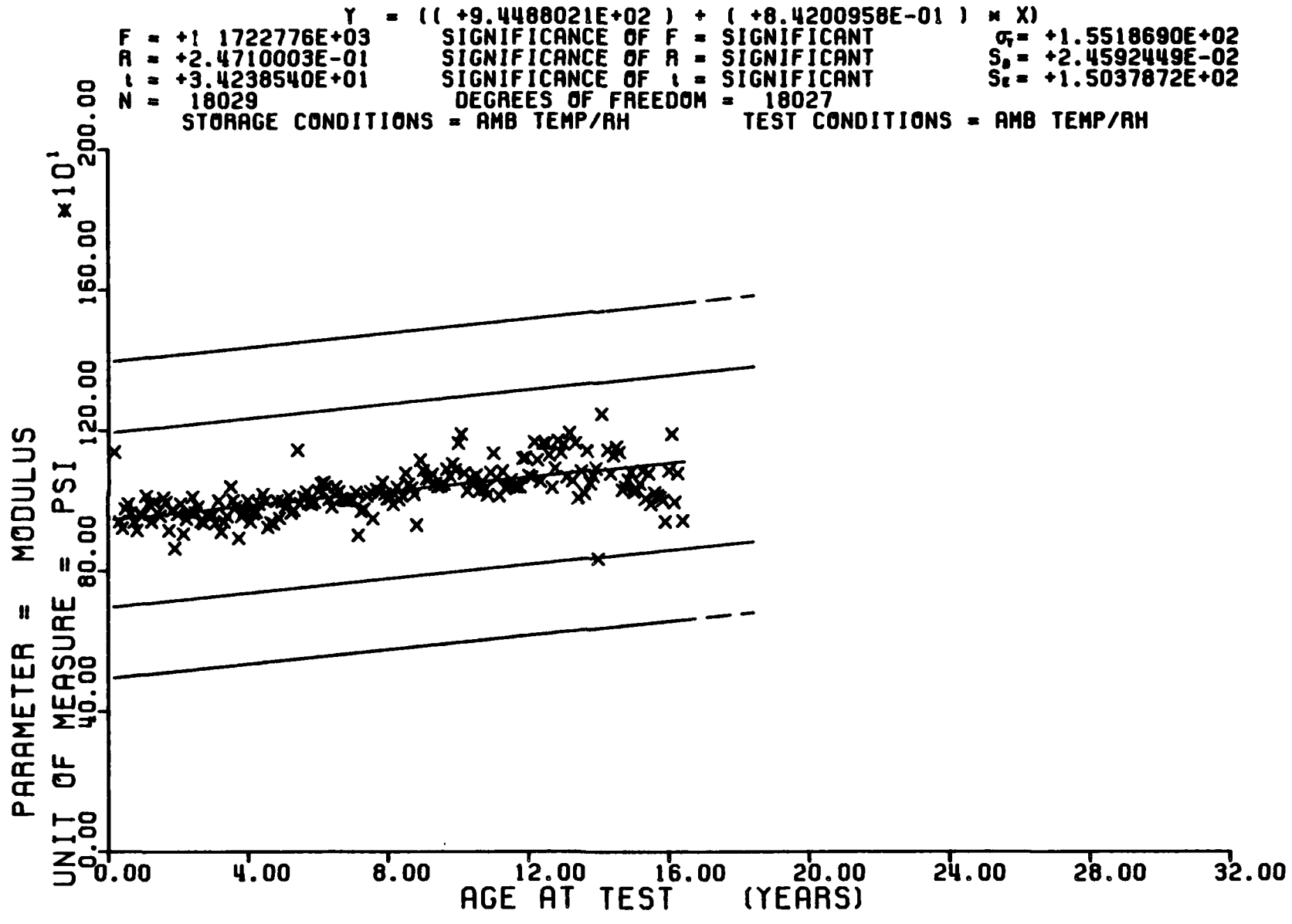

Y = ((+9.4488021E+02) + (+8.4200958E-01) * X)
F = +1 1722776E+03 SIGNIFICANCE OF F = SIGNIFICANT σ_r = +1.5518690E+02
R = +2.4710003E-01 SIGNIFICANCE OF R = SIGNIFICANT S_b = +2.4592449E-02
t = +3.4238540E+01 SIGNIFICANCE OF t = SIGNIFICANT S_E = +1.5037872E+02
N = 18029 DEGREES OF FREEDOM = 18027
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10^1
200.00
160.00
120.00
80.00
40.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,L.R.TENSILE,MODULUS,CHS=2.0 IN/MIN TP-H1011

Figure 14

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	2	33	23	58	30	83	10	108	8	134	18
8	2	34	22	59	27	84	14	109	21	135	15
9	4	35	24	60	22	85	18	110	34	136	6
11	4	36	26	61	36	86	10	111	8	137	10
12	14	37	16	62	38	87	10	112	8	138	27
13	17	38	11	63	41	88	16	113	24	139	18
14	6	39	25	64	42	89	23	114	49	140	6
15	6	40	10	65	28	90	19	115	55	141	9
16	8	41	8	66	29	91	27	116	59	142	10
17	4	42	6	67	32	92	18	117	42	143	6
18	14	43	2	68	33	93	26	118	23	144	43
19	11	44	4	69	26	94	36	119	21	145	27
20	20	45	2	70	71	95	29	120	41	146	8
21	4	46	6	71	42	96	58	121	8	147	6
22	10	47	18	72	31	97	50	122	13	148	2
23	6	48	5	73	44	98	52	123	11	149	6
24	8	49	34	74	38	99	64	124	2	150	8
25	23	50	36	75	36	100	42	125	8	151	11
26	13	51	27	76	26	101	33	127	8	152	4
27	11	52	46	77	13	102	10	128	8	153	2
28	17	53	48	78	14	103	6	129	4	154	4
29	14	54	22	79	27	104	11	130	19	155	4
30	18	55	34	80	14	105	15	131	18	156	4
31	16	56	24	81	15	106	10	132	47	157	12
32	23	57	30	82	22	107	2	133	30	158	1

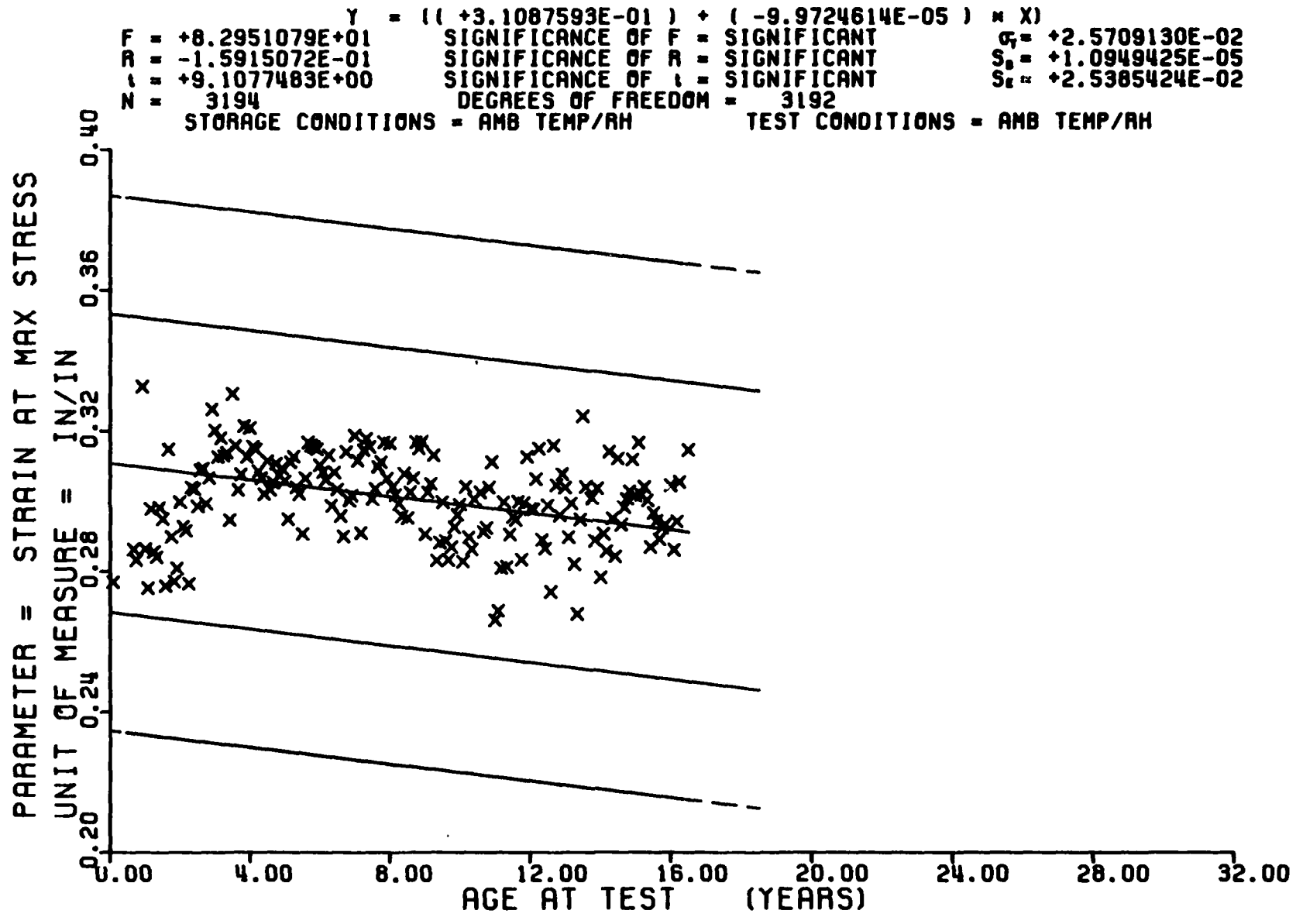
WING 6,H,P,TRIAXIAL TENSILE,STRAIN AT MAX STRESS,CHS=1750 IN/MIN,800 PSI

This sample size summary is applicable to figures 15 thru 18.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
159	4	185	8
160	6	186	12
161	10	187	7
162	2	188	8
163	4	189	12
165	2	190	2
166	3	192	4
167	4	193	2
168	7	194	2
169	2	195	2
170	5	198	2
171	2		
172	6		
173	4		
174	4		
175	4		
176	8		
177	5		
178	6		
179	4		
180	8		
181	5		
182	6		
183	4		
184	8		

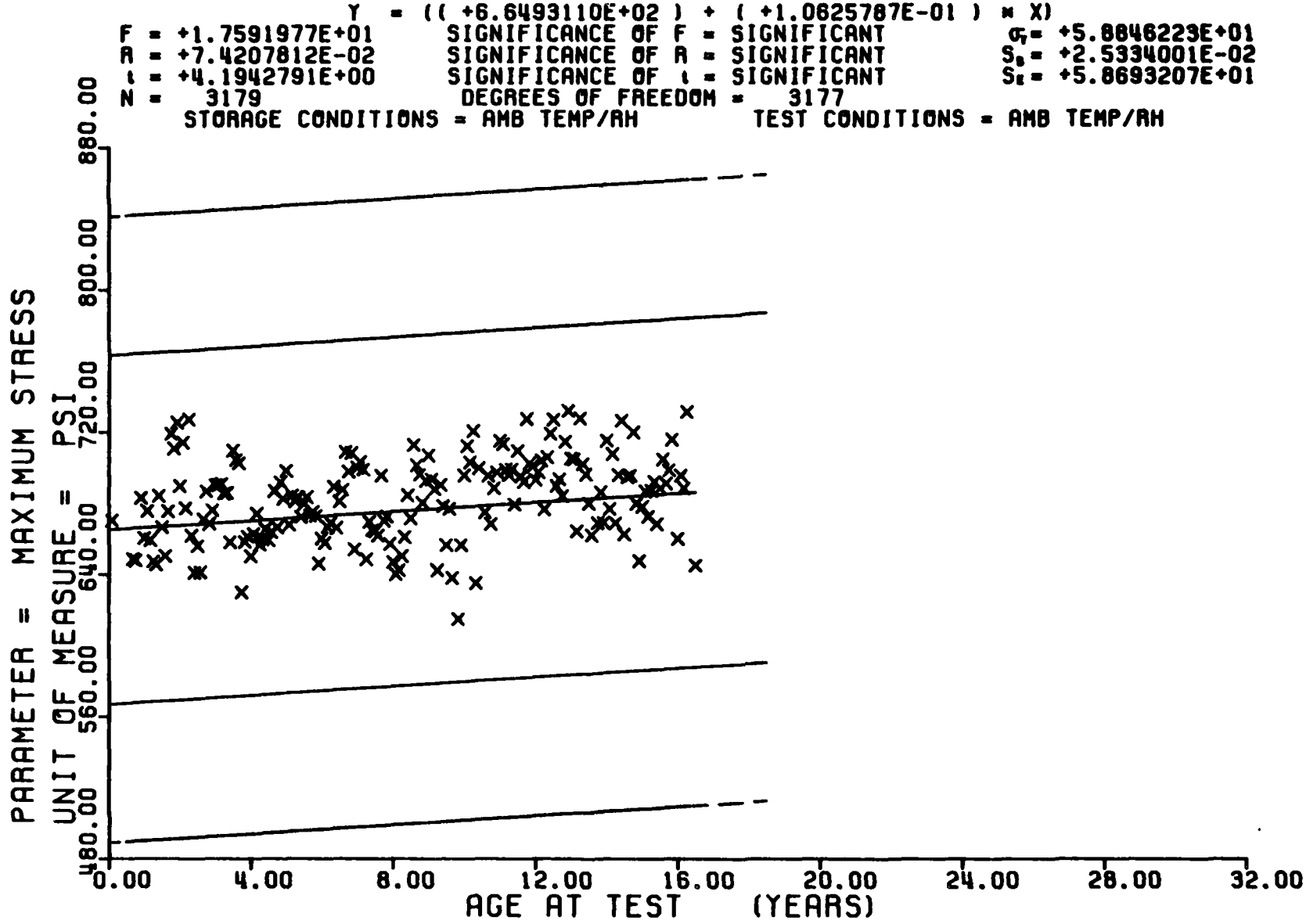
WING 6,H.R.TRIAXIAL TENSILE,STRAIN AT MAX STRESS,CHS=1750 IN/MIN,800 PSI



σ_f = +2.5709130E-02
S_b = +1.0949425E-05
S_t = +2.5385424E-02

WING 6,H.R.TRIAXIAL TENSILE,STRAIN AT MAX STRESS,CHS=1750 IN/MIN,800 PSI

Figure 15



WING 6,H.R.TRIAXIAL TENSILE,MAXIMUM STRESS,CHS=1750 IN/MIN, 800 PSI

Figure 16

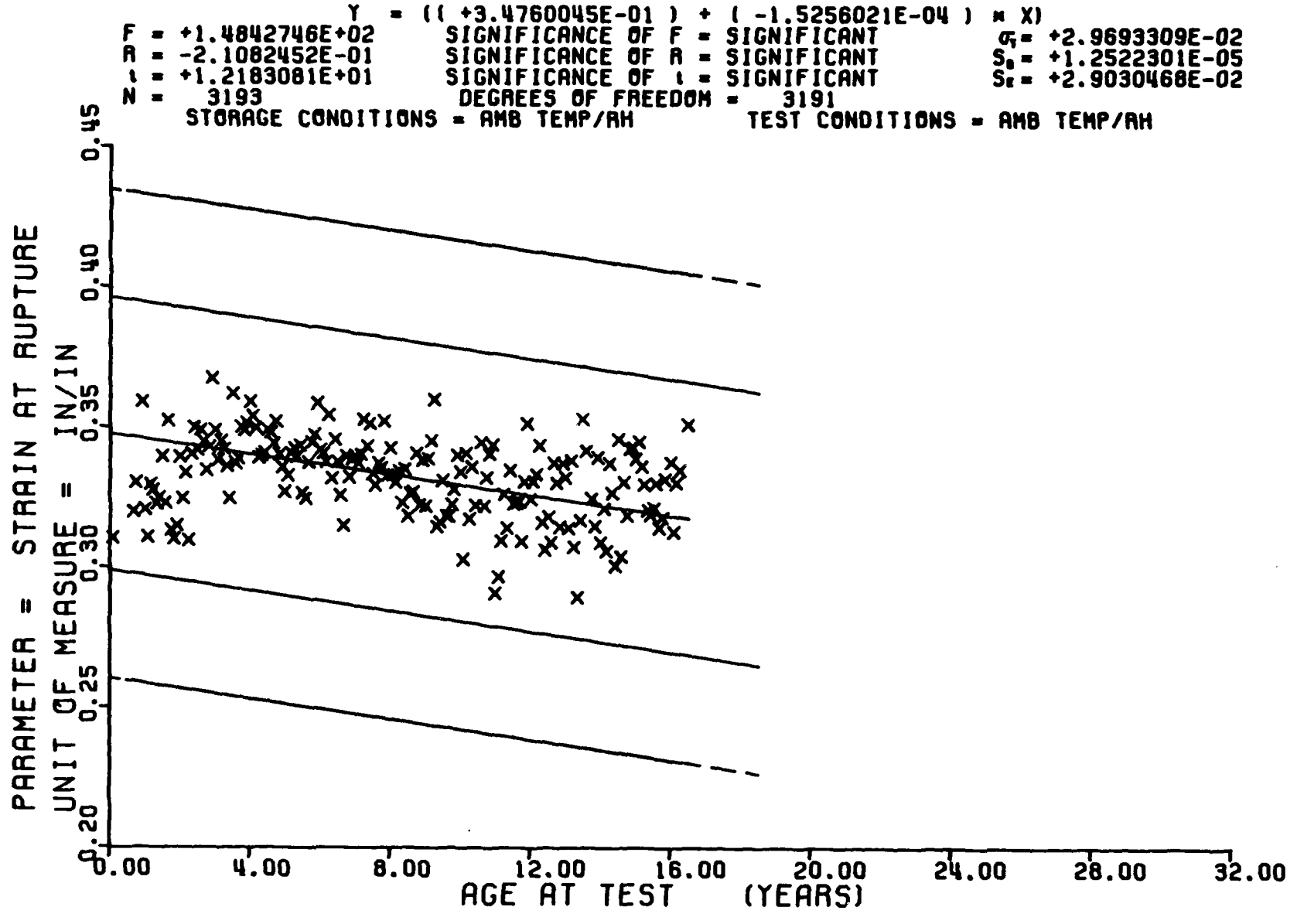

Y = ((+3.4760045E-01) + (-1.5256021E-04) * X)
F = +1.4842746E+02 SIGNIFICANCE OF F = SIGNIFICANT σ1 = +2.9693309E-02
R = -2.1082452E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.2522301E-05
I = +1.2183081E+01 SIGNIFICANCE OF I = SIGNIFICANT Se = +2.9030468E-02
N = 3193 DEGREES OF FREEDOM = 3191
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.45
0.40
0.35
0.30
0.25
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,H.R.TRIAXIAL TENSILE,STRAIN AT RUPTURE,CHS=1750 IN/MIN, 800 PSI

Figure 17

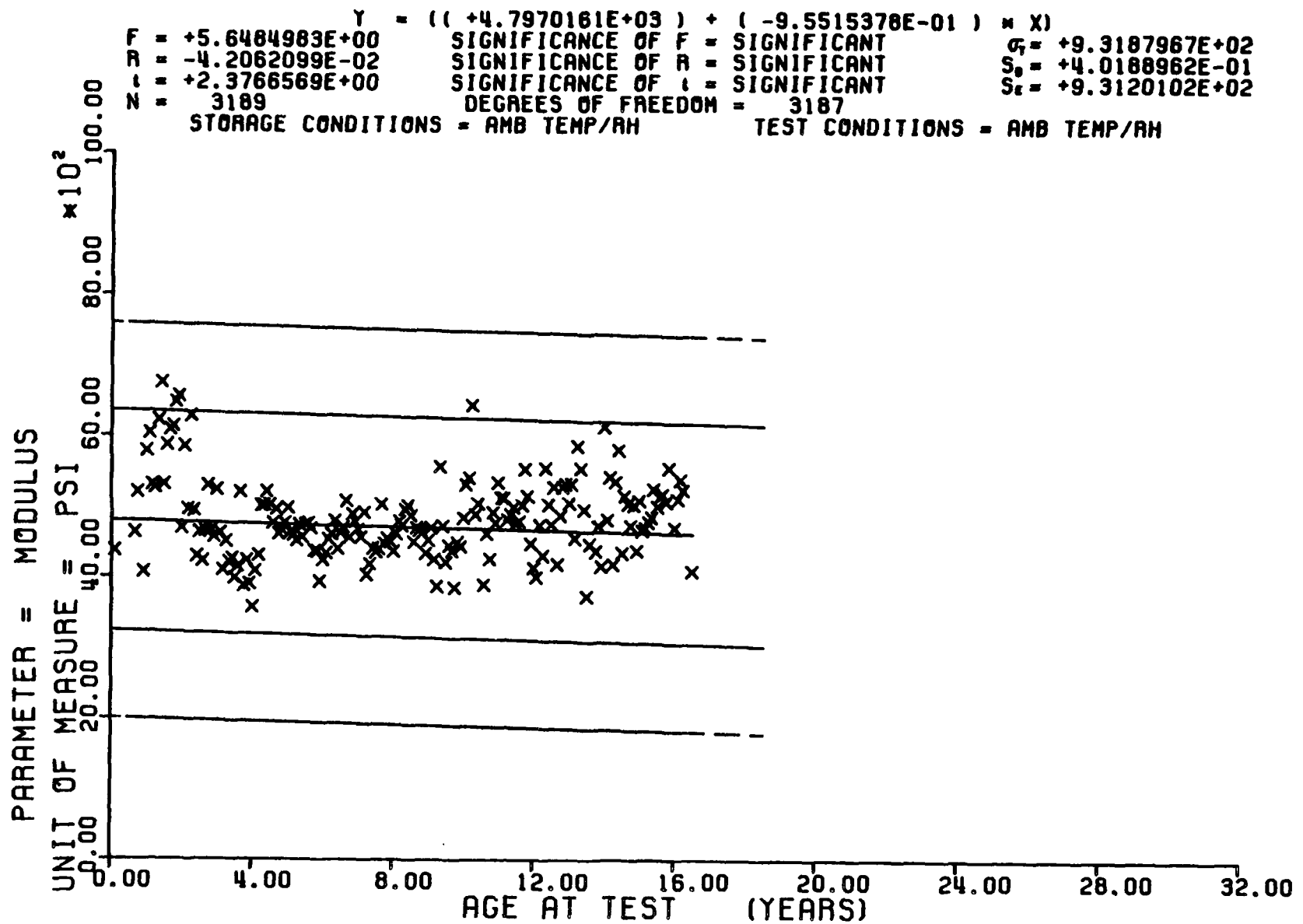

Y = ((+4.7970161E+03) + (-9.5515378E-01) * X)
F = +5.6484983E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -4.2062099E-02 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.3766569E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 3189 DEGREES OF FREEDOM = 3187
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σ1 = +9.3187967E+02
S0 = +4.0188962E-01
Sε = +9.3120102E+02
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10²
100.00
80.00
60.00
40.00
20.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,H.R.TRIAXIAL TENSILE,MODULUS,CHS=1750 IN/MIN AT 800 PSI

Figure 18

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
9	2	35	7	60	39	85	15	110	40	135	13
11	12	36	26	61	45	86	11	111	17	136	12
12	12	37	26	62	68	87	27	112	12	137	23
13	18	38	24	63	120	88	23	113	85	138	51
14	4	39	34	64	43	89	46	114	57	139	67
15	12	40	11	65	41	90	50	115	31	140	10
16	8	41	21	66	17	91	30	116	34	141	14
17	12	42	7	67	26	92	27	117	122	142	12
18	14	43	7	68	52	93	36	118	31	143	8
19	4	44	12	69	47	94	49	119	34	144	23
20	4	45	5	70	53	95	37	120	50	145	14
21	24	46	9	71	54	96	69	121	27	146	40
22	4	47	10	72	48	97	61	122	6	147	20
23	2	48	4	73	85	98	75	123	21	148	7
24	16	49	28	74	65	99	51	124	14	149	9
25	24	50	26	75	51	100	32	125	43	150	8
26	12	51	61	76	31	101	45	126	16	151	6
27	31	52	106	77	19	102	9	127	28	152	4
28	20	53	53	78	32	103	7	128	28	153	4
29	37	54	23	79	63	104	24	129	12	154	6
30	28	55	49	80	20	105	9	130	23	155	7
31	29	56	54	81	17	106	11	131	32	156	4
32	42	57	52	82	24	107	12	132	34	157	5
33	24	58	54	83	23	108	12	133	11	158	10
34	21	59	24	84	8	109	23	134	36	159	2

WING 6.N.R.HYDROSTATIC.STRAIN AT MAX STRESS.1750IN/MIN.800 PSI

This sample size summary is applicable to figures 19 thru 23.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
160	4	186	10
161	10	187	11
162	4	188	12
163	1	189	10
165	2	190	8
166	4	192	2
167	4	193	2
168	8	194	2
169	6	195	1
170	4	198	2
171	3		
172	4		
173	2		
174	2		
175	6		
176	10		
177	4		
178	6		
179	2		
180	10		
181	6		
182	8		
183	6		
184	6		
185	6		

WING 6,H,R,HYDROSTATIC,STRAIN AT MAX STRESS,1750IN/MIN,800 PSI

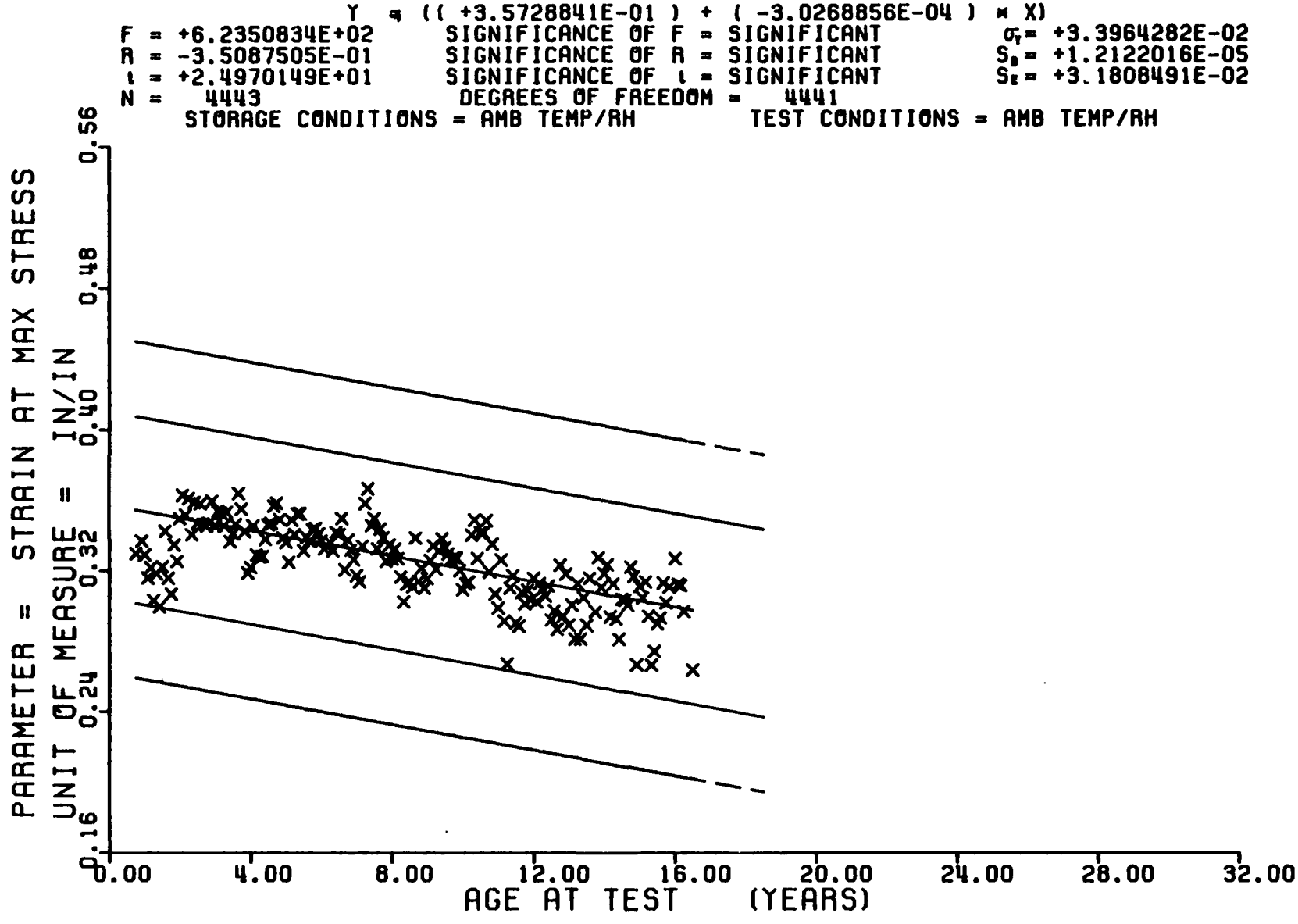

Y = ((+3.5728841E-01) + (-3.0268856E-04) * X)
F = +6.2350834E+02 SIGNIFICANCE OF F = SIGNIFICANT σr= +3.3964282E-02
R = -3.5087505E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +1.2122016E-05
t = +2.4970149E+01 SIGNIFICANCE OF t = SIGNIFICANT Sε= +3.1808491E-02
N = 4443 DEGREES OF FREEDOM = 4441
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.56
0.48
0.40
0.32
0.24
0.16
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,H.R.HYDROSTATIC,STRAIN AT MAX STRESS,1750IN/MIN,800 PSI

Figure 19

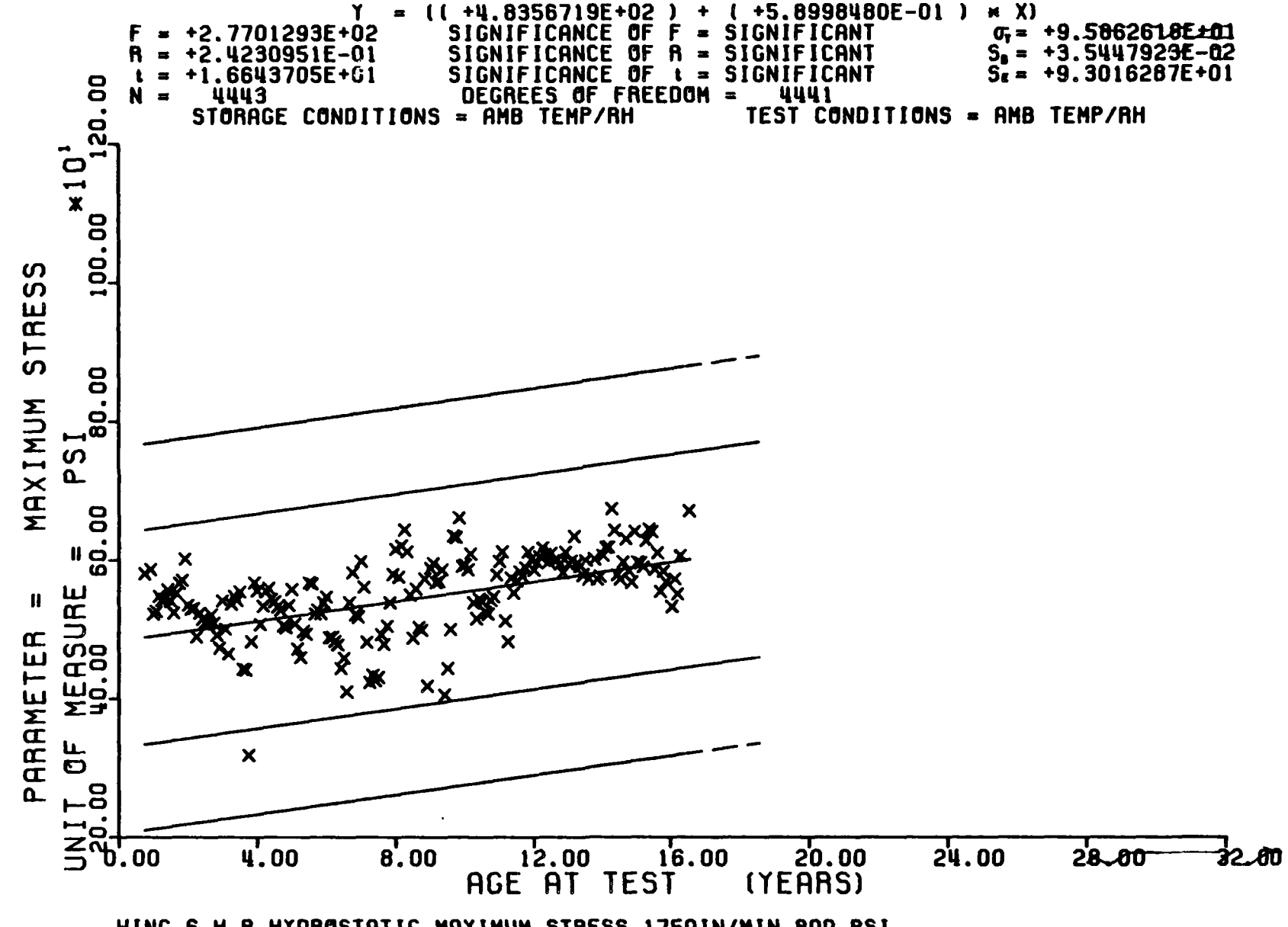

Y = ((+4.8356719E+02) + (+5.8998480E-01) * X)
F = +2.7701293E+02 SIGNIFICANCE OF F = SIGNIFICANT
R = +2.4230951E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +1.6643705E+01 SIGNIFICANCE OF t = SIGNIFICANT
N = 4443 DEGREES OF FREEDOM = 4441
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI *10¹
120.00
100.00
80.00
60.00
40.00
20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,H.R.HYDROSTATIC,MAXIMUM STRESS,1750IN/MIN,800 PSI

Figure 29

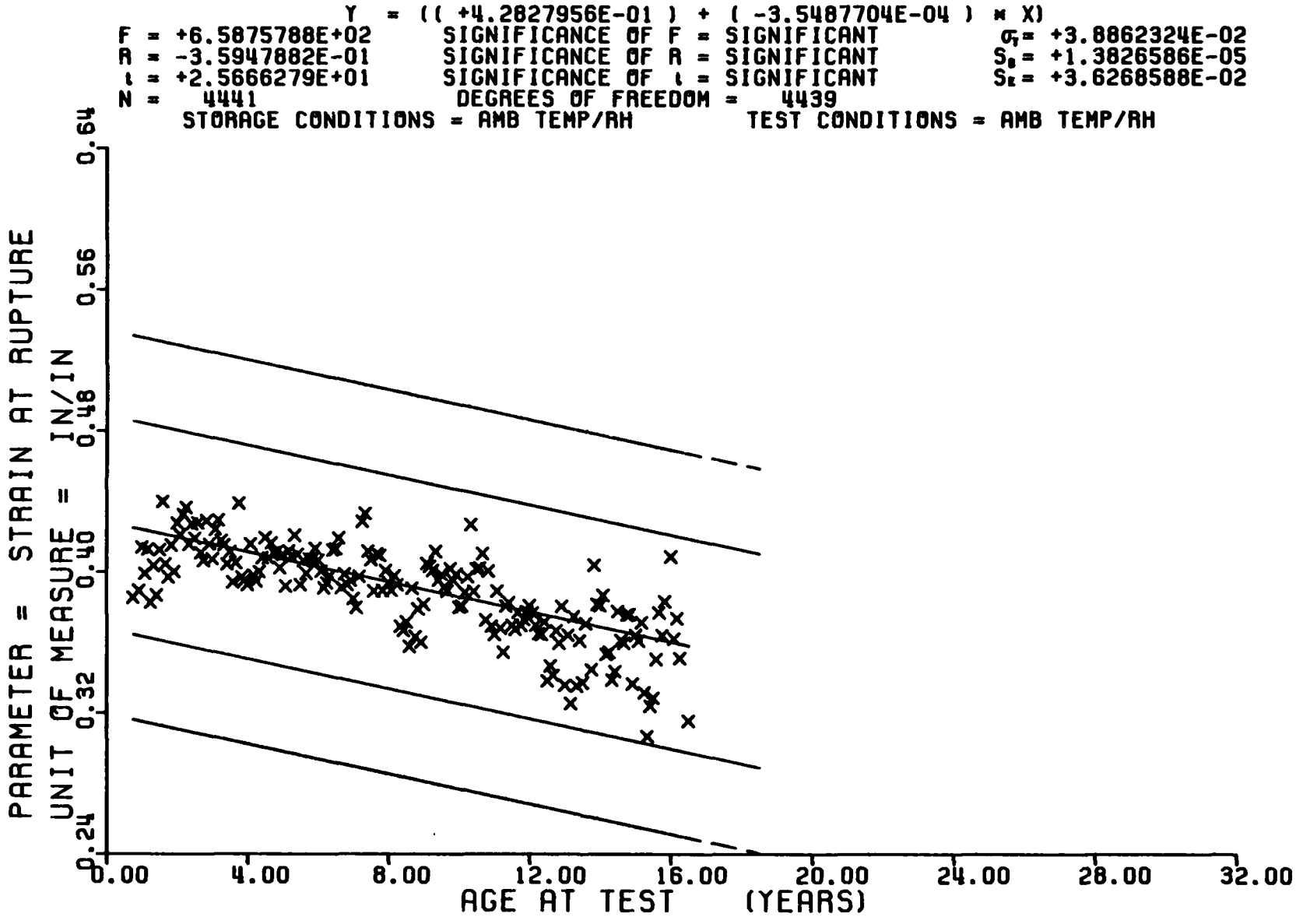
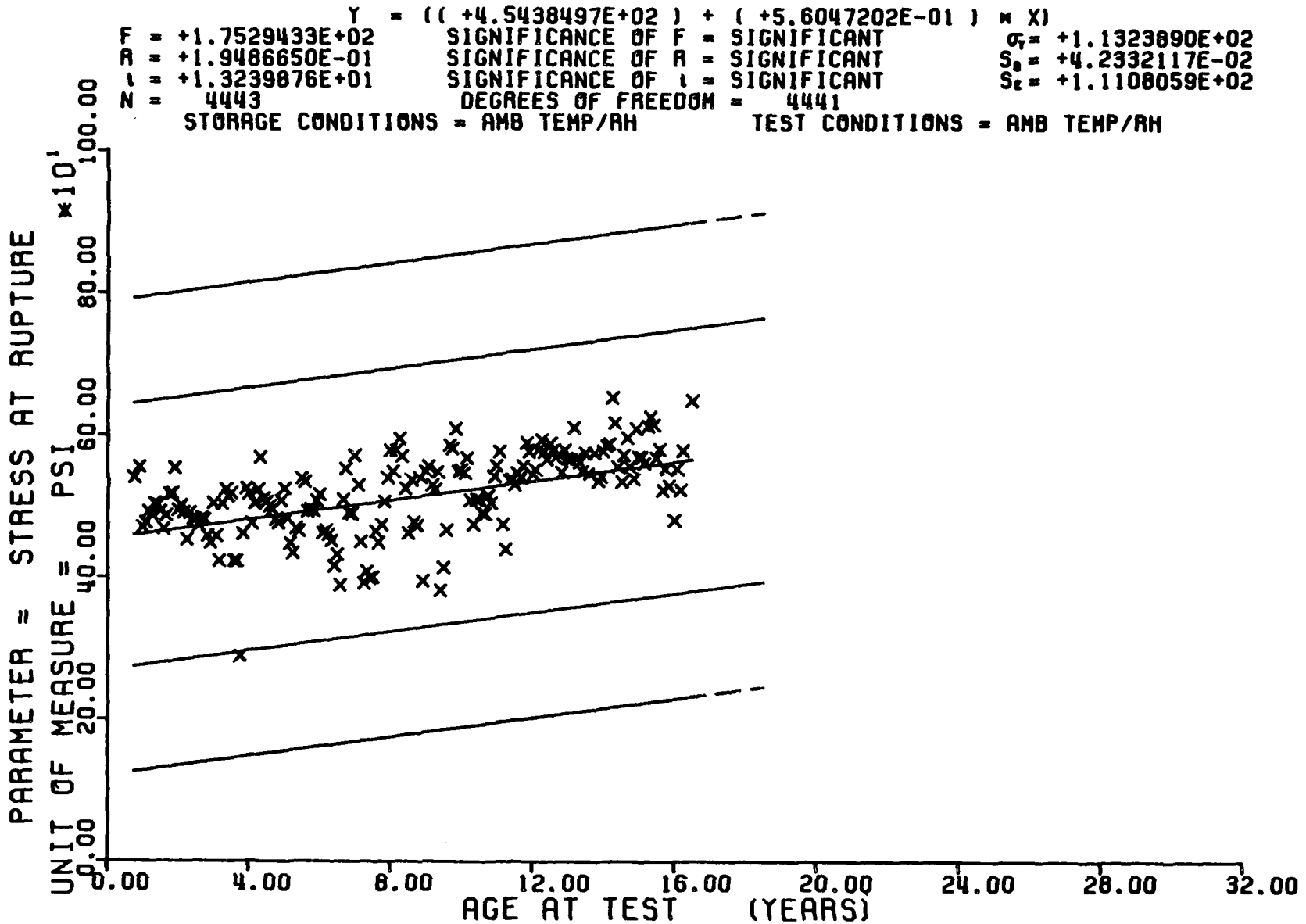
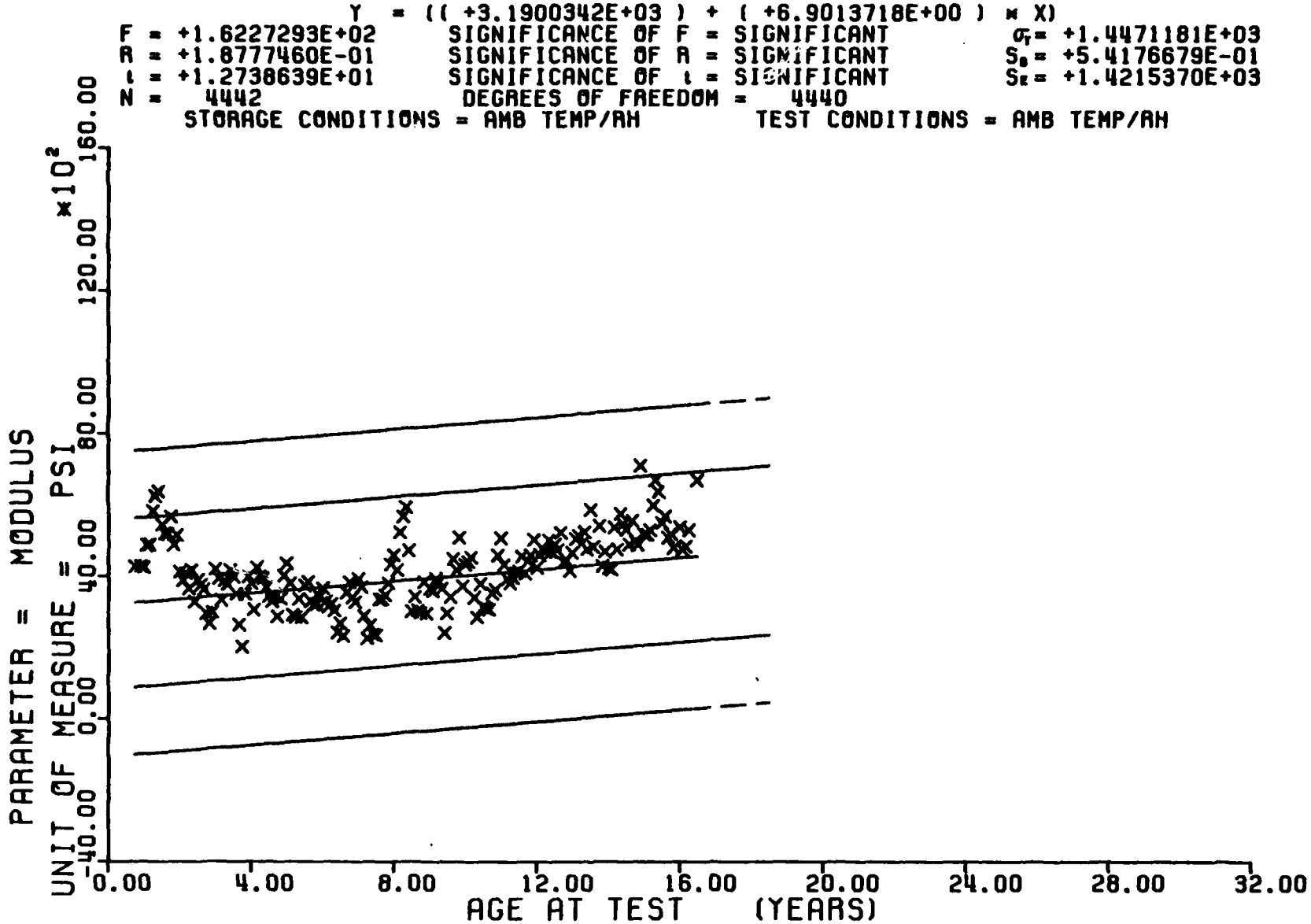

Y = ((+4.2827956E-01) + (-3.5487704E-04) * X)
F = +6.5875788E+02 SIGNIFICANCE OF F = SIGNIFICANT σr= +3.8862324E-02
R = -3.5947882E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +1.3826586E-05
t = +2.5666279E+01 SIGNIFICANCE OF t = SIGNIFICANT St= +3.6268588E-02
N = 4441 DEGREES OF FREEDOM = 4439
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.64
0.56
0.48
0.40
0.32
0.24
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,H.R.HYDROSTATIC,STRAIN AT RUPTURE,1750IN/MIN,800 PSI

Figure 21



WING 6,H.R.HYDROSTATIC,STRESS AT RUPTURE,1750IN/MIN,800 PSI

Figure 22



WING 6,H.R.HYDROSTATIC,MODULUS,1750 IN/MIN, 800 PSI

Figure 23

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
12	2	42	6	67	9	92	5	117	27	142	21
13	3	43	12	68	9	93	25	118	21	143	41
15	1	44	3	69	20	94	26	119	19	144	12
16	3	45	6	70	30	95	26	120	42	145	6
17	4	46	3	71	41	96	51	121	21	146	6
19	3	47	6	72	30	97	54	122	6	147	12
21	4	48	6	73	39	98	55	123	9	148	3
22	3	49	2	74	32	99	41	124	27	149	12
24	6	50	26	75	32	100	23	125	20	150	3
25	6	51	45	76	17	101	27	126	21	151	15
26	9	52	46	77	40	102	11	127	18	152	9
27	3	53	18	78	28	103	18	128	23	153	32
29	3	54	27	79	15	104	12	129	2	154	9
30	3	55	27	80	17	105	9	130	36	155	9
31	3	56	21	81	23	106	5	131	42	156	9
32	6	57	24	82	35	107	12	132	8	157	9
33	6	58	20	83	12	108	15	133	21	158	6
34	3	59	9	84	17	109	18	134	31	159	6
35	6	60	5	85	18	110	12	135	21	160	9
36	19	61	21	86	9	111	6	136	2	161	18
37	9	62	46	87	33	112	20	137	12	162	3
38	6	63	23	88	19	113	51	138	37	163	3
39	6	64	30	89	21	114	35	139	48	164	3
40	8	65	5	90	30	115	49	140	9	165	3
41	6	66	2	91	14	116	42	141	15	166	6

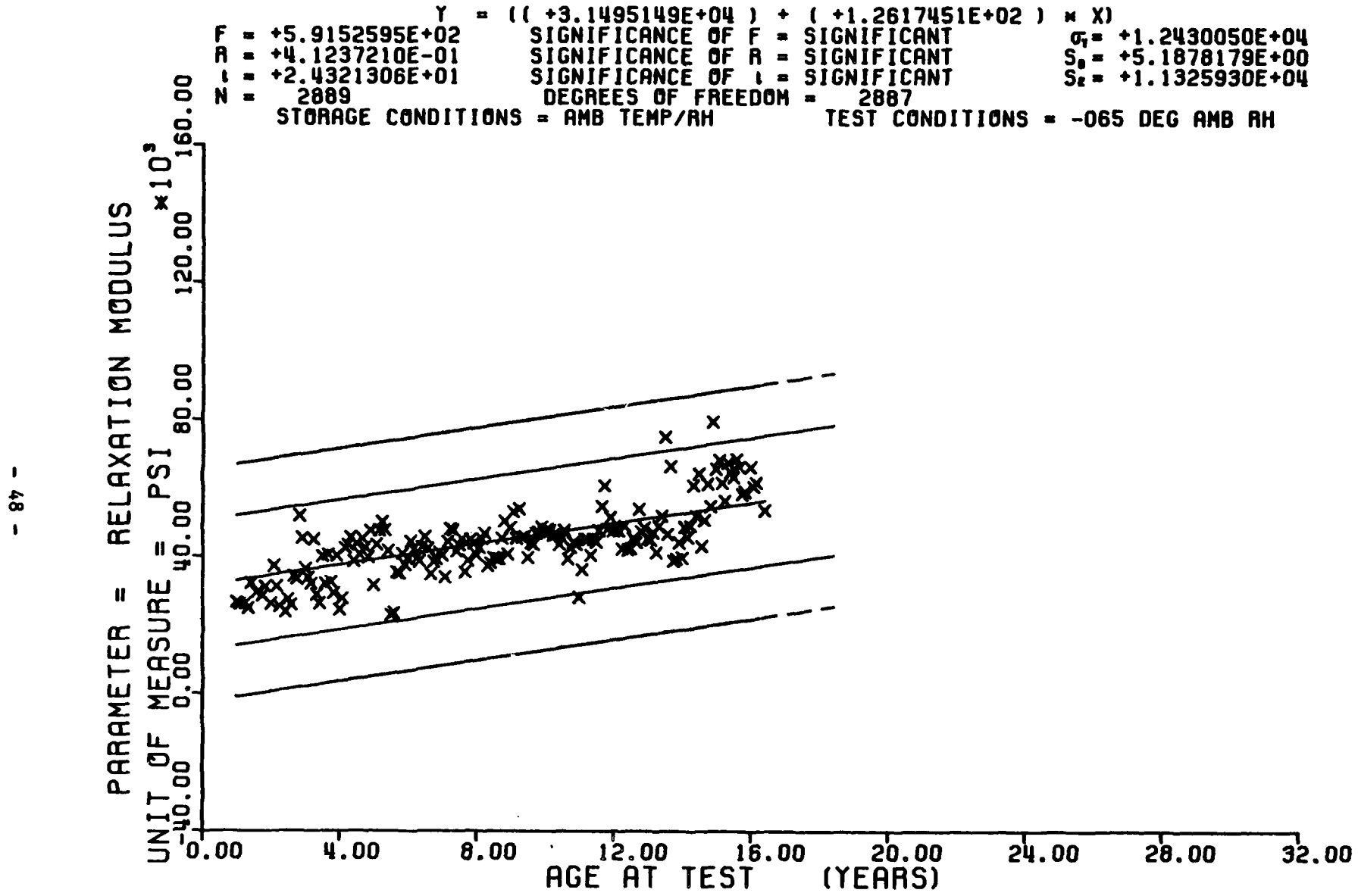
WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,10 SEC,-65 DEG F,TPH-1011

This sample size summary is applicable to figures 24 thru 27.

*** SAMPLE SIZE SUMMARY ***

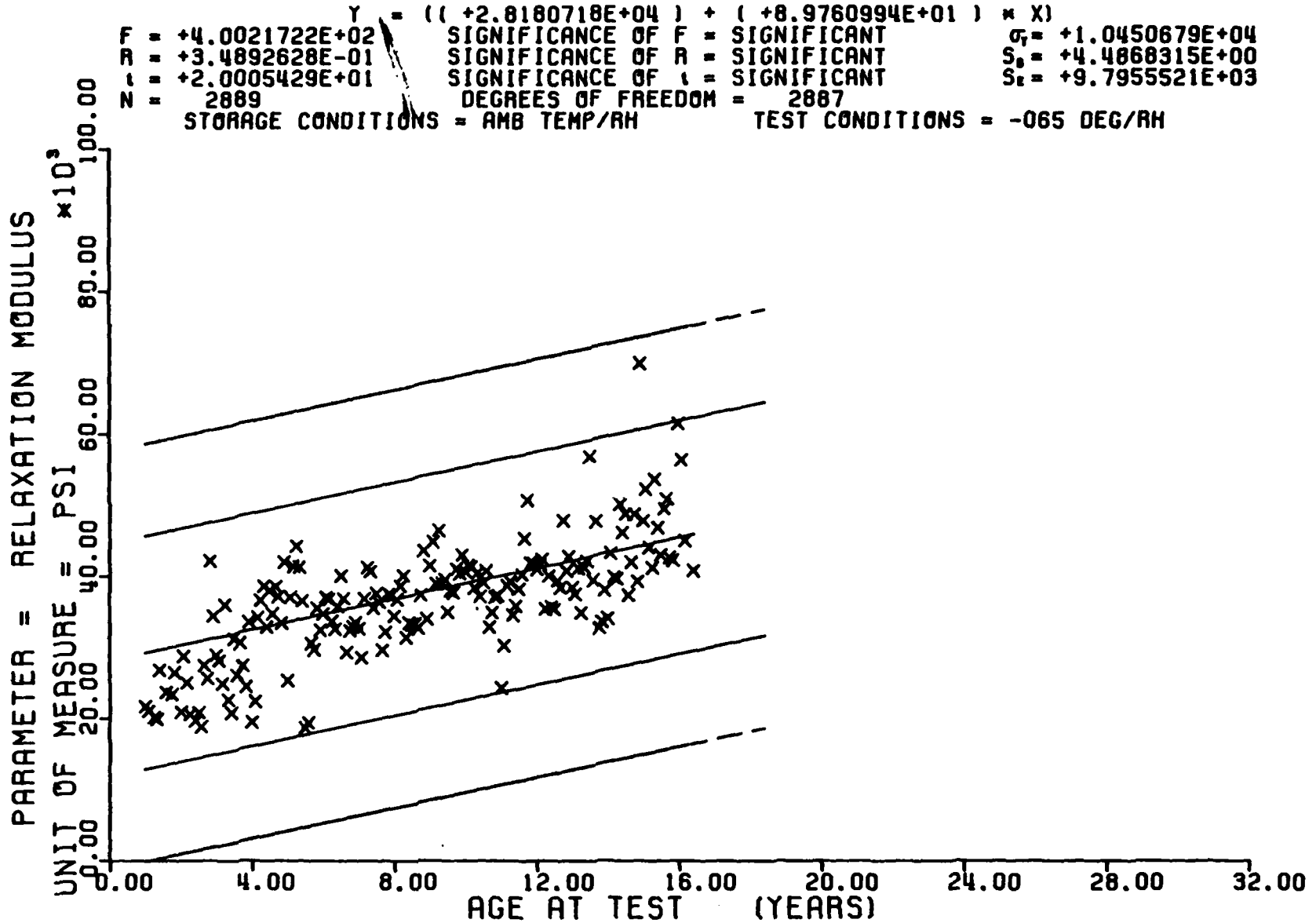
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
167	12	193	6
168	3	194	6
169	3	197	3
170	6		
171	12		
172	6		
173	3		
174	12		
175	3		
176	9		
177	6		
178	15		
179	6		
180	15		
181	9		
182	9		
183	15		
184	9		
185	9		
186	21		
187	15		
188	21		
189	12		
190	6		
192	6		

WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,10 SEC,-65 DEG F,TPH-1011



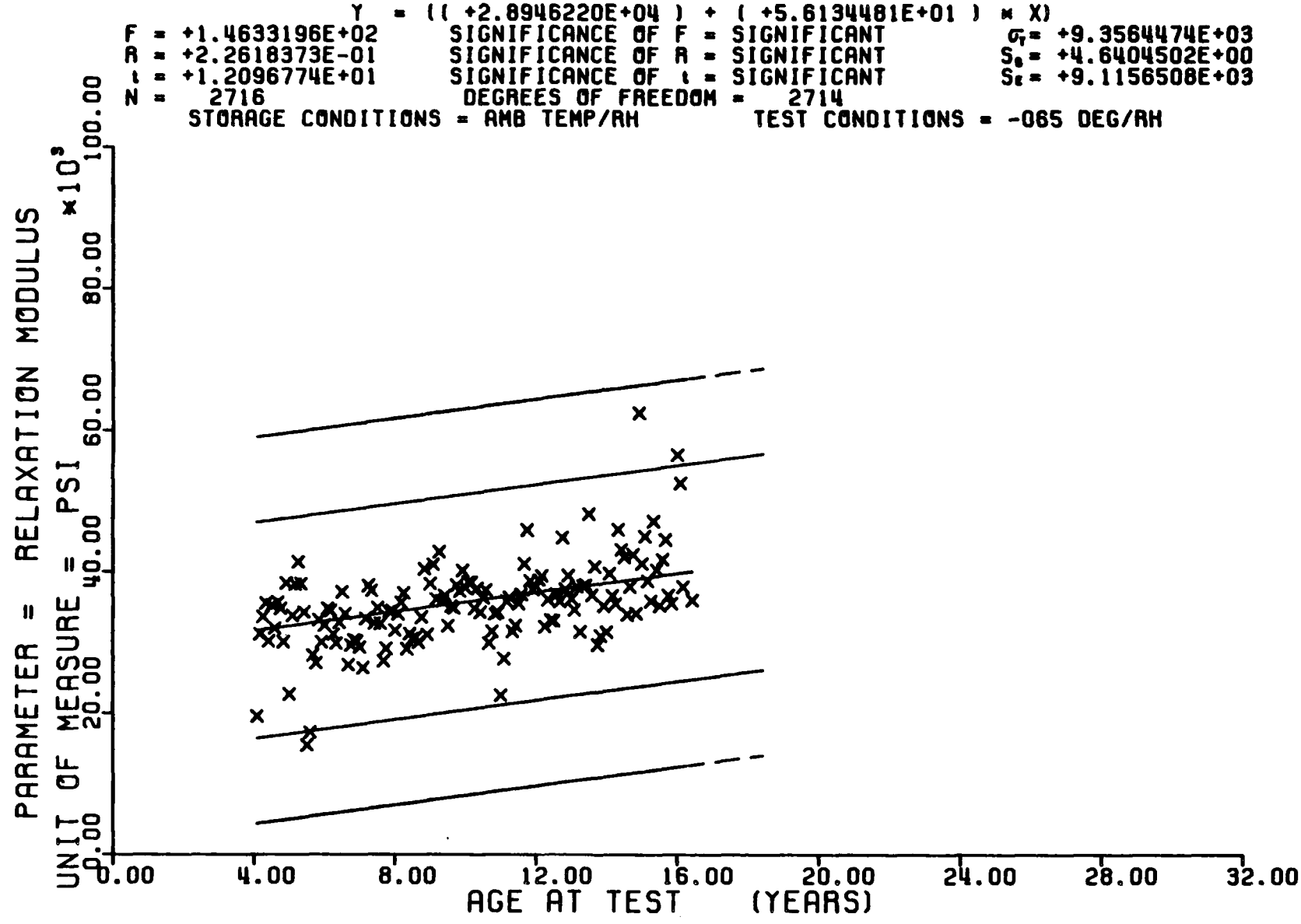
WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 10 SEC, -65 DEG F, TPH-1011

Figure 24



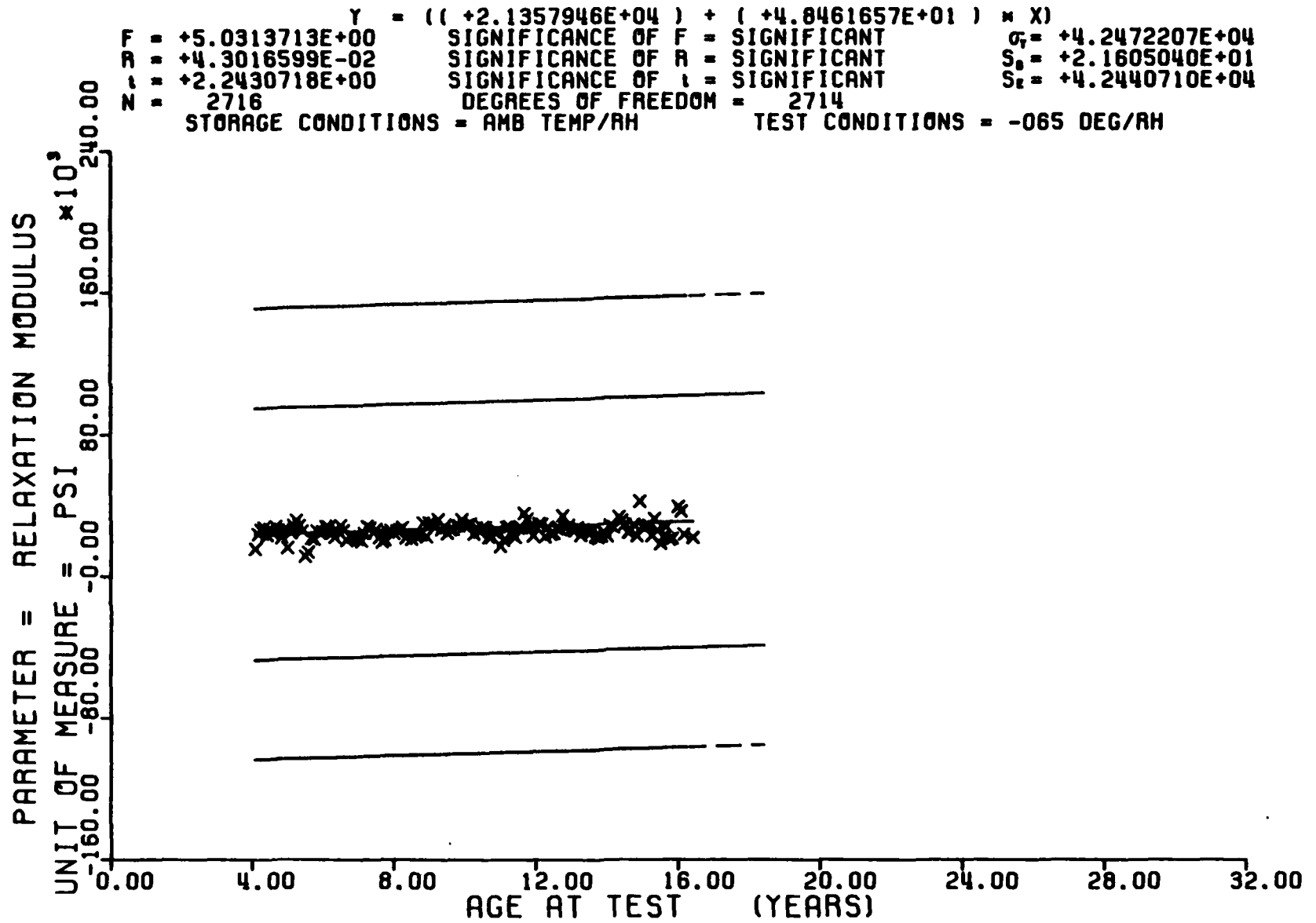
WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,50 SEC,-65 DEG F,TPH-1011

Figure 25



WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 100 SEC, -65 DEG F, TPH-1011

Figure 26



WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,1000 SEC,-65 DEG F,TPH-1011

Figure 27

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
12	3	41	2	66	6	91	18	116	49	141	15
13	3	42	9	67	6	92	24	117	21	142	33
15	3	43	9	68	12	93	18	118	21	143	40
16	3	44	3	69	21	94	22	119	15	144	12
17	7	45	6	70	30	95	21	120	35	145	6
18	3	46	3	71	44	96	57	121	21	146	3
20	3	47	9	72	36	97	68	122	6	147	12
21	6	48	3	73	35	98	54	123	11	148	3
23	3	49	6	74	34	99	42	124	16	149	12
24	2	50	27	75	28	100	21	125	16	150	3
25	6	51	51	76	29	101	24	126	19	151	15
26	7	52	47	77	36	102	9	127	50	152	9
27	2	53	14	78	35	103	21	128	20	153	6
29	8	54	30	79	15	104	15	129	1	154	9
30	3	55	18	80	19	105	9	130	33	155	9
31	6	56	12	81	24	106	9	131	51	156	9
32	3	57	27	82	33	107	12	132	9	157	9
33	6	58	19	83	9	108	18	133	15	158	6
34	6	59	9	84	24	109	15	134	43	159	6
35	3	60	12	85	21	110	12	135	18	160	9
36	18	61	20	86	15	111	6	136	3	161	18
37	9	62	48	87	30	112	24	137	18	162	3
38	5	63	24	88	23	113	59	138	44	163	3
39	6	64	24	89	21	114	37	139	54	164	3
40	12	65	9	90	29	115	60	140	9	165	3

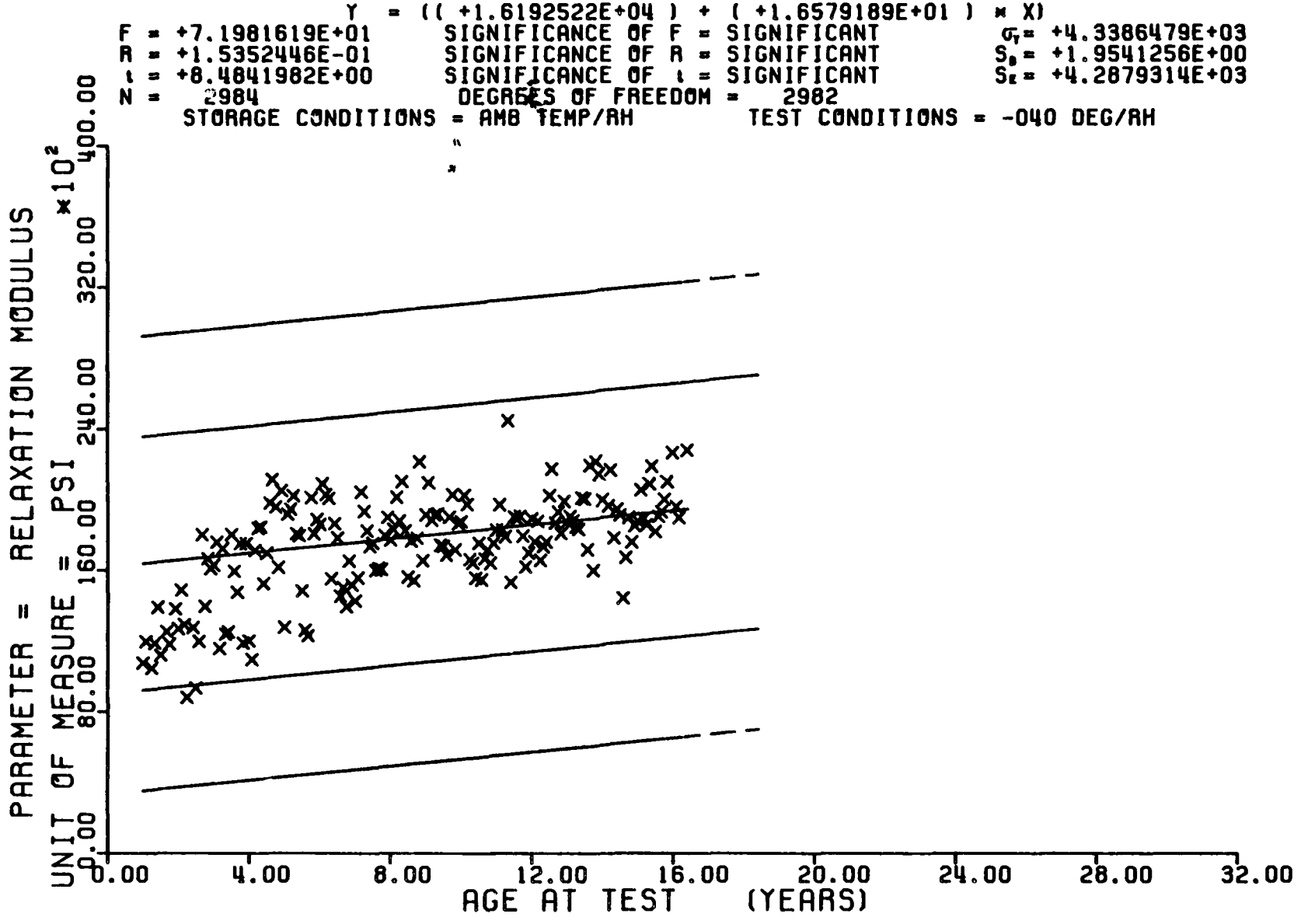
WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,10 SEC,-40 DEG F,TPH-1011

This sample size summary is applicable to figures 28 thru 31.

*** SAMPLE SIZE SUMMARY ***

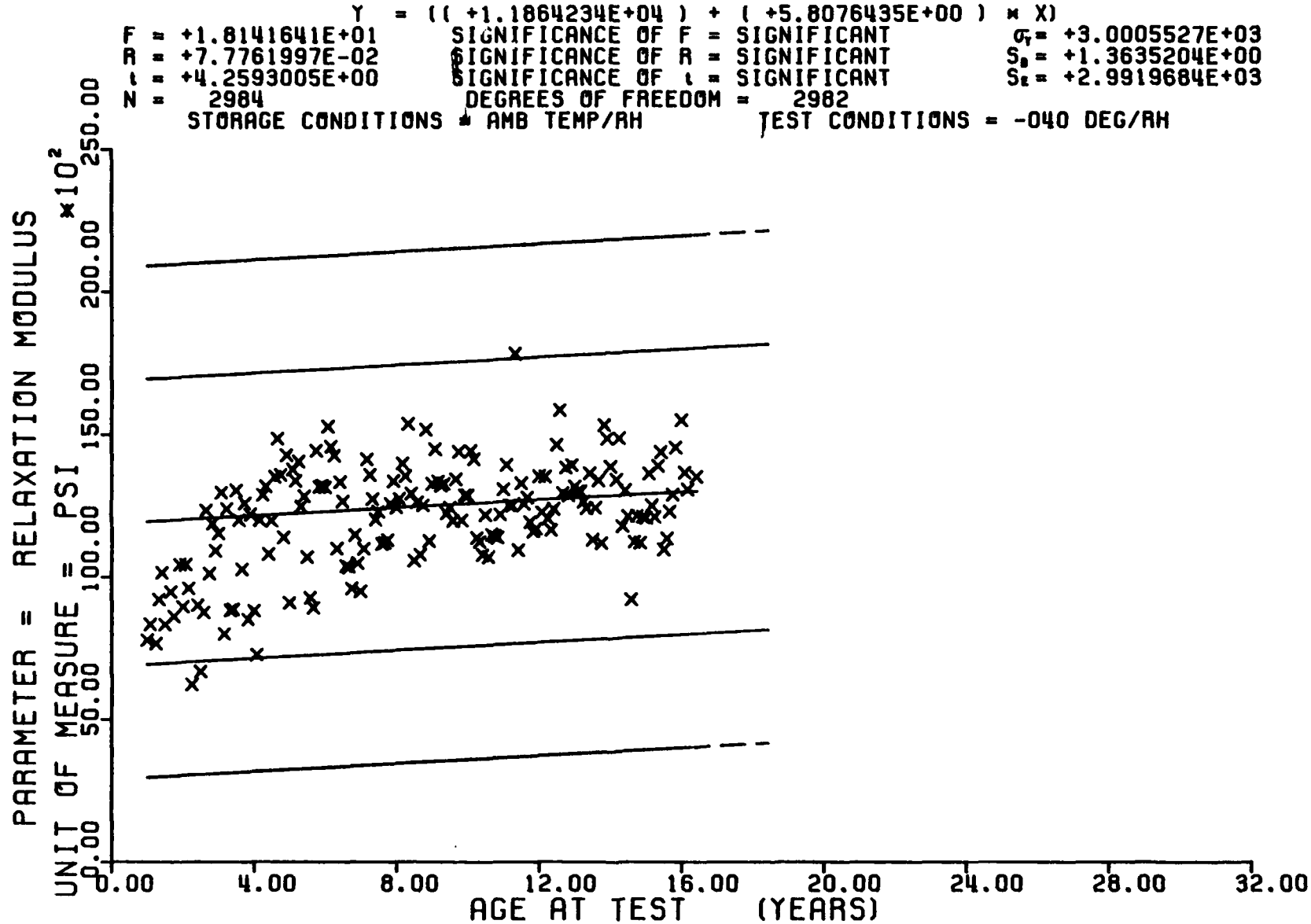
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
166	6	193	6
167	12	194	6
168	6	197	3
170	9		
171	9		
172	6		
173	3		
174	12		
175	3		
176	9		
177	6		
178	15		
179	6		
180	15		
181	9		
182	9		
183	15		
184	9		
185	12		
186	21		
187	11		
188	21		
189	12		
190	6		
192	6		

WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,10 SEC,-40 DEG F,TPH-1011



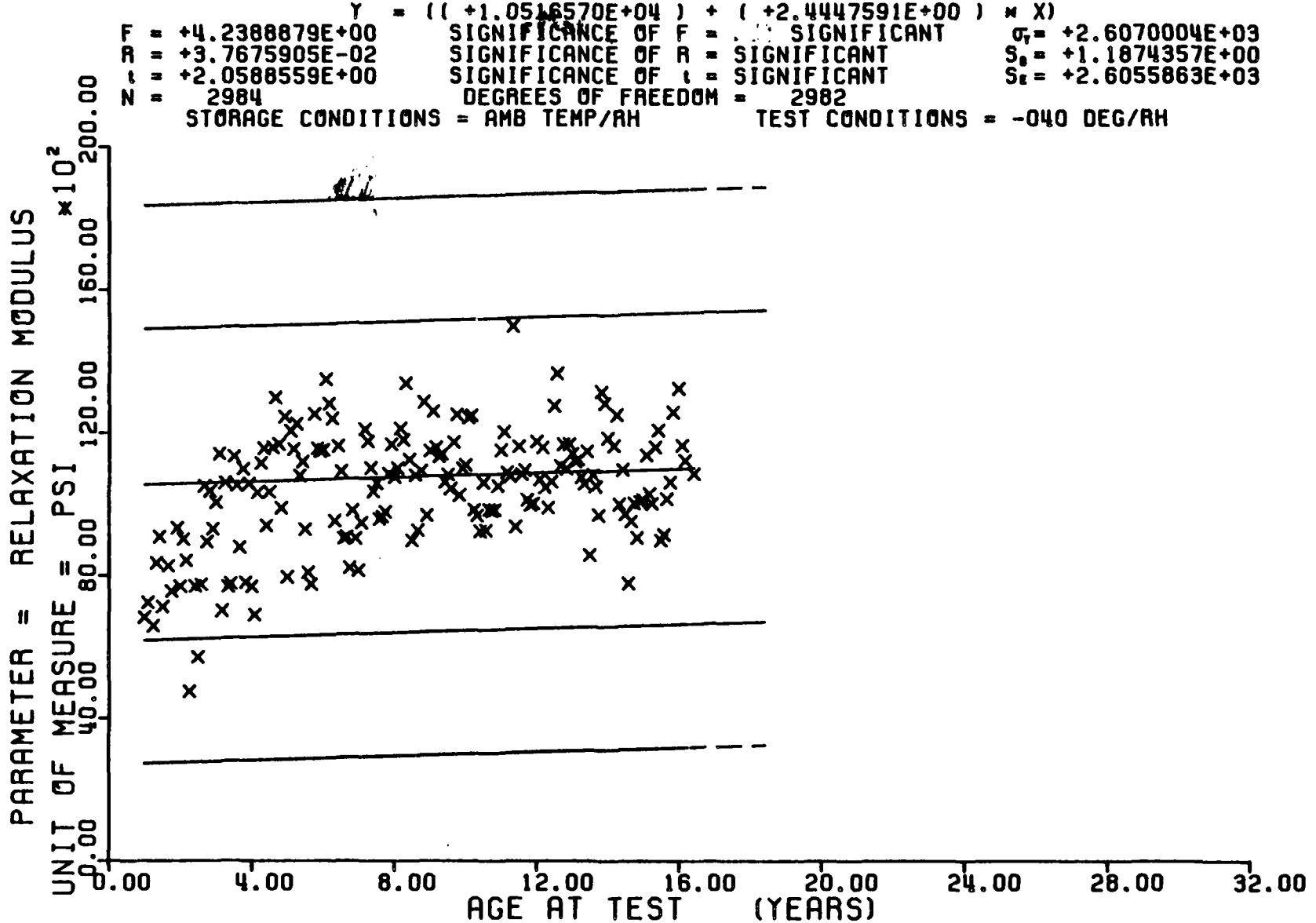
WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 10 SEC, -40 DEG F, TPH-1011

Figure 28



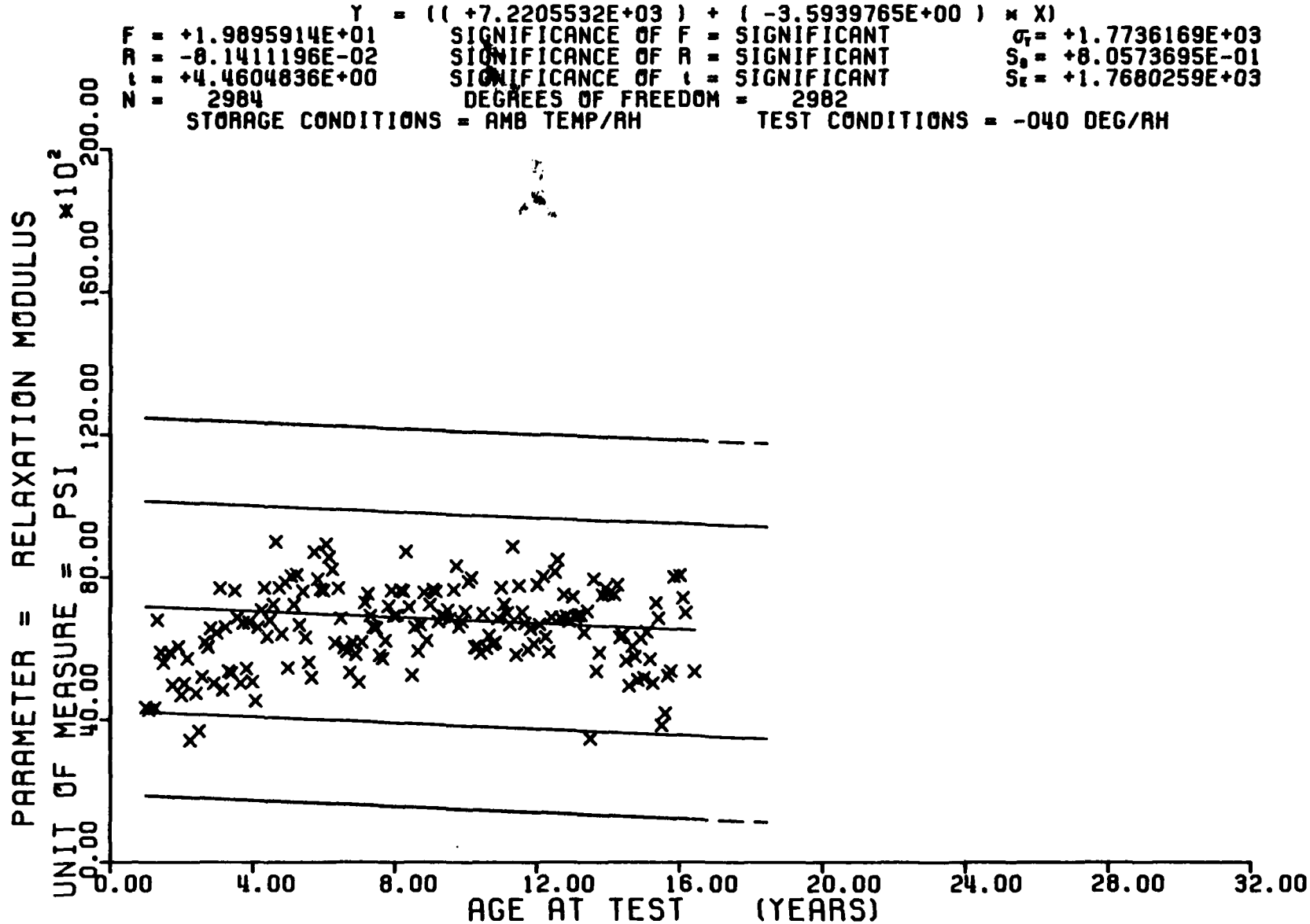
WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,50 SEC,-40 DEG F,TPH-1011

Figure 29



WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,100 SEC,-40 DEG F,TPH-1011

Figure 30



WING 6,STRESS RELAXATION MODULUS,0.5% STRAIN,1000 SEC,-40 DEG F,TPH-1011

Figure 31

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
12	3	41	3	66	9	91	21	116	51	142	30
13	3	42	15	67	10	92	21	117	21	143	26
15	6	43	5	68	9	93	21	118	21	144	12
17	7	44	3	69	29	94	21	119	27	145	6
18	3	45	6	70	24	95	32	120	33	146	6
19	9	46	6	71	46	96	57	121	21	147	12
21	9	47	5	72	42	97	57	122	9	148	3
22	6	48	3	73	24	98	54	123	12	149	12
23	6	49	6	74	39	99	42	124	23	151	15
24	6	50	27	75	38	100	21	125	18	152	9
25	6	51	55	76	25	101	27	126	20	153	6
26	6	52	48	77	37	102	11	127	17	154	9
27	6	53	15	78	36	103	21	128	24	155	9
28	3	54	32	79	19	104	5	129	3	156	9
29	9	55	18	80	24	105	9	130	33	157	9
30	3	56	18	81	39	106	9	131	54	158	6
31	9	57	30	82	27	107	15	132	15	159	6
32	3	58	16	83	15	108	18	133	9	160	9
33	12	59	6	84	27	109	12	134	42	161	18
34	6	60	22	85	12	110	12	135	18	162	3
35	9	61	21	86	21	111	6	137	18	163	3
36	24	62	49	87	26	112	35	138	29	164	3
37	9	63	24	88	24	113	53	139	69	165	3
39	12	64	27	89	24	114	41	140	12	166	6
40	8	65	12	90	36	115	48	141	12	167	12

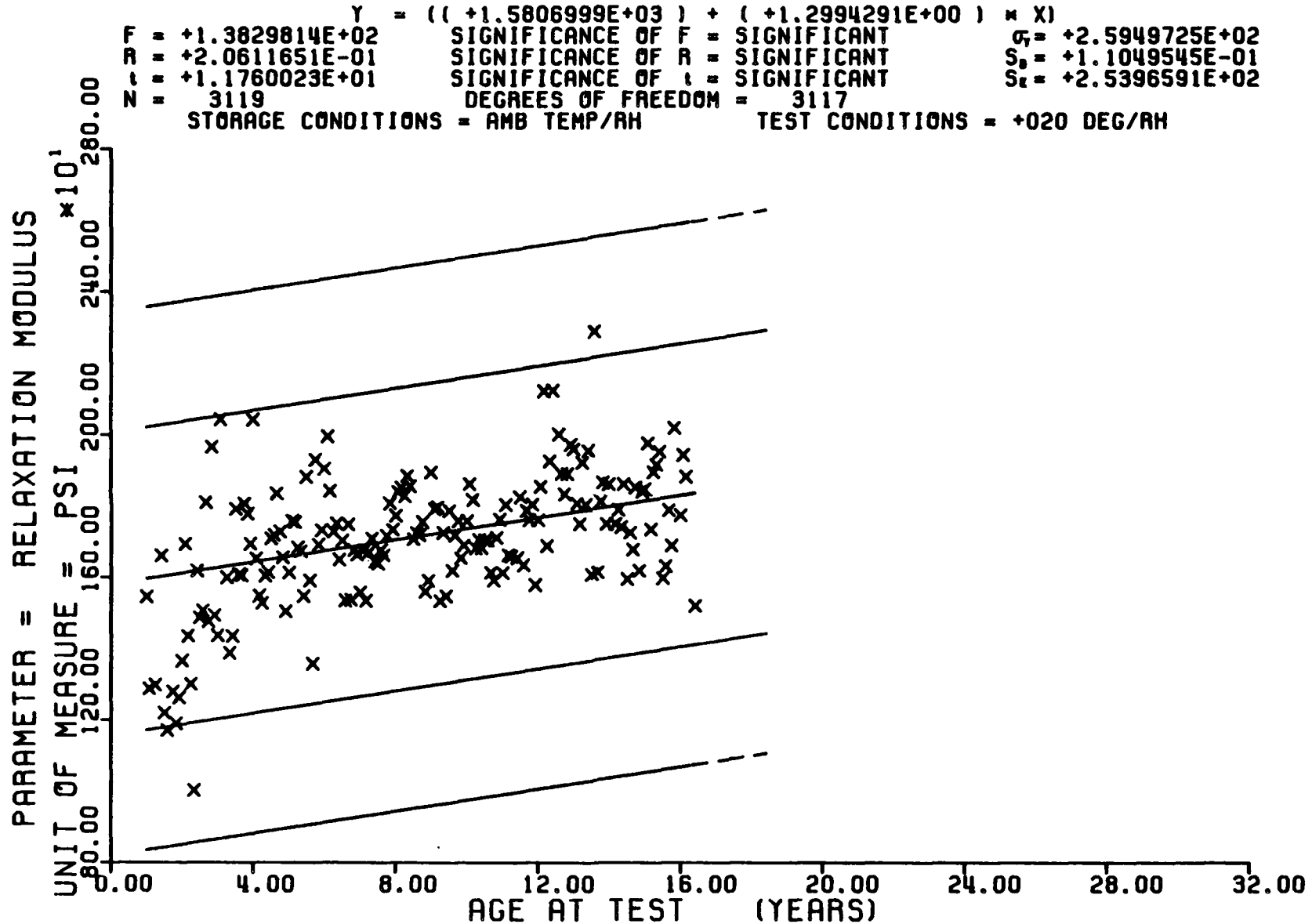
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC, 20 DEG F,TPH-1011

This sample size summary is applicable to figures 32 thru 35.

*** SAMPLE SIZE SUMMARY ***

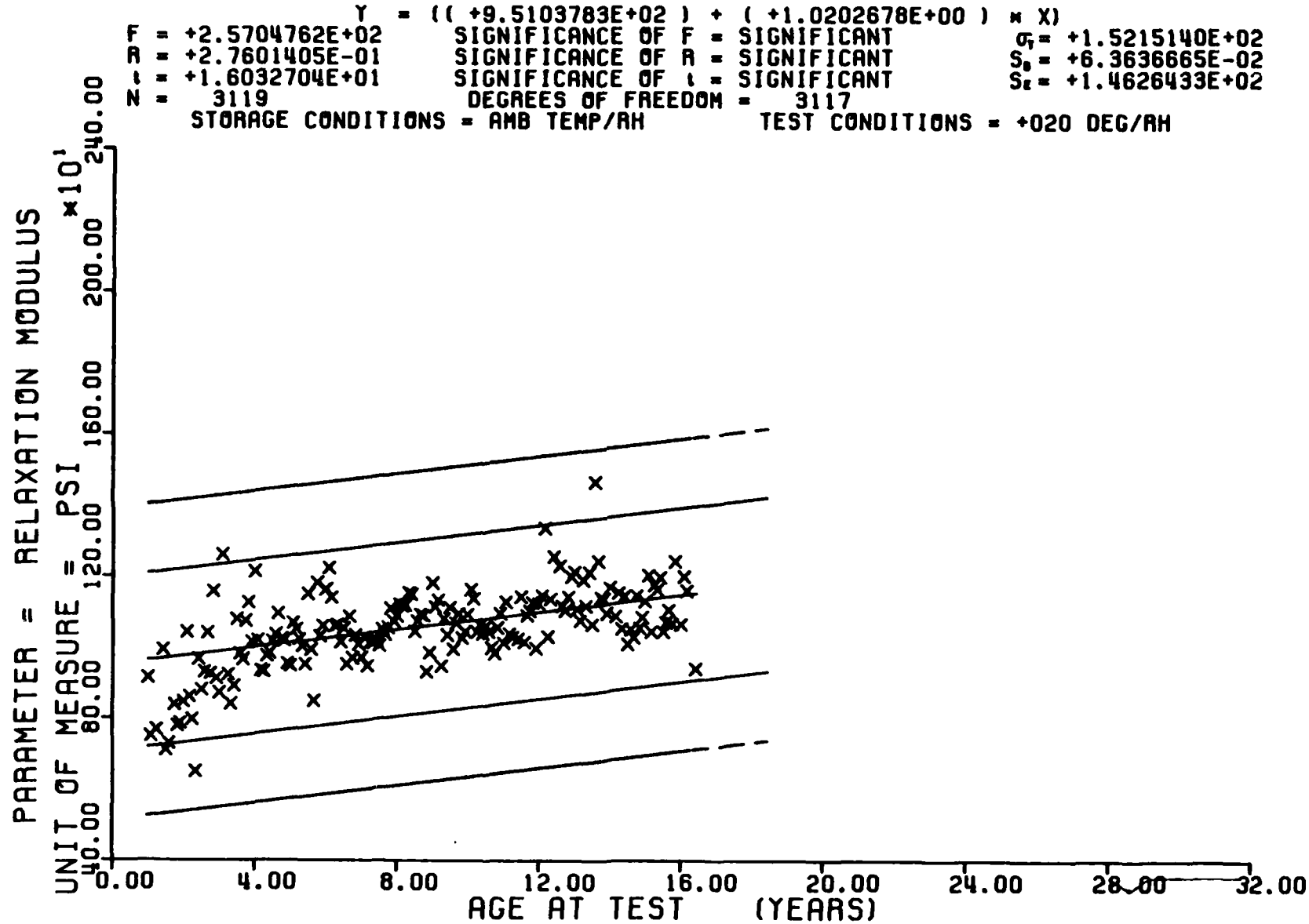
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
168	6	197	3
170	9		
171	9		
172	6		
173	3		
174	9		
175	6		
176	9		
177	6		
178	15		
179	5		
180	15		
181	9		
182	9		
183	18		
184	9		
185	18		
186	24		
187	18		
188	18		
189	12		
190	6		
192	6		
193	6		
194	6		

WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC, 20 DEG F,TPH-1011



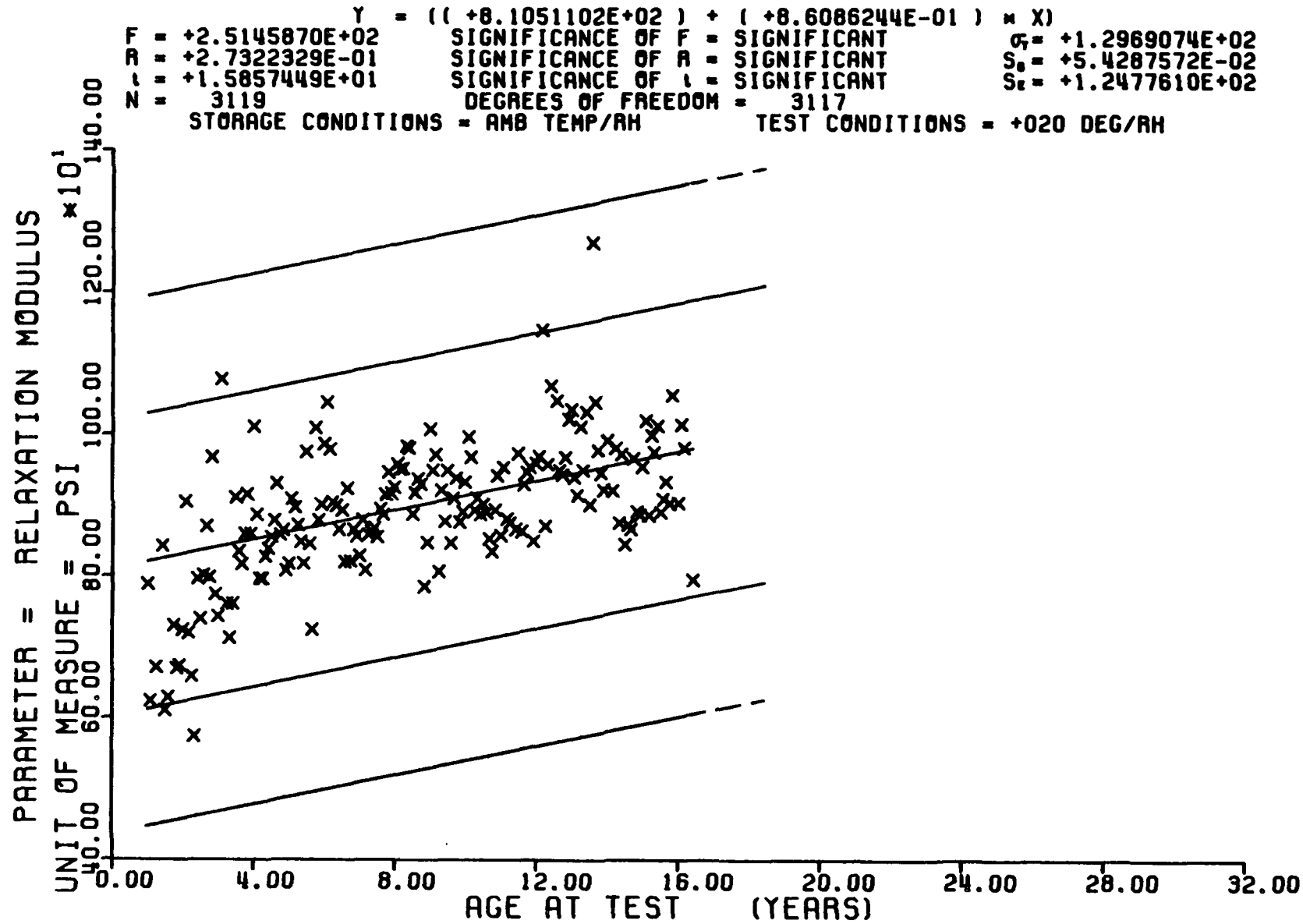
WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 20 DEG F, TPH-1011

Figure 32



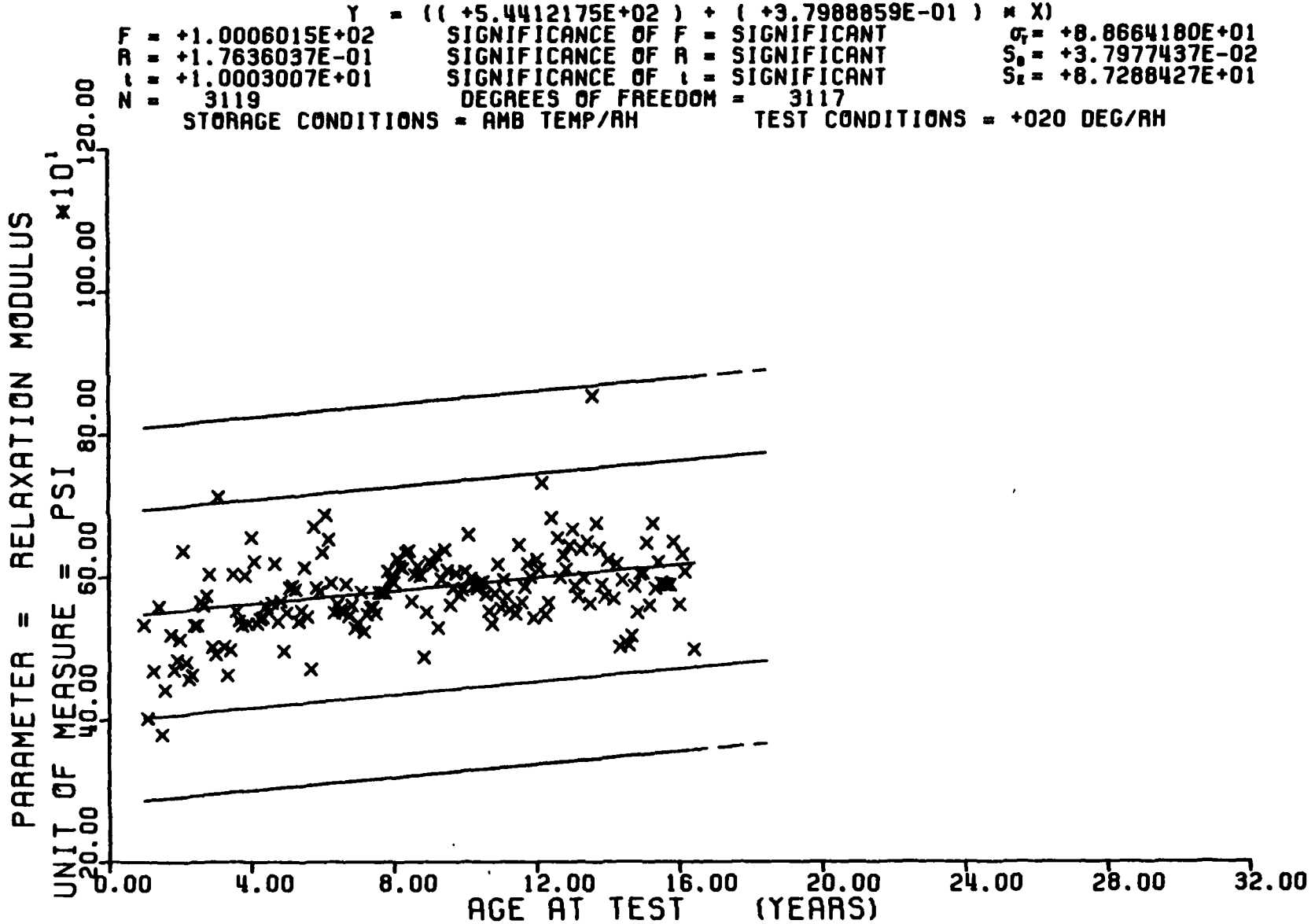
WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC, 20 DEG F, TPH-1011

Figure 33



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 20 DEG F, TPH-1011

Figure 34



WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,1000 SEC, 20 DEG F,TPH-1011

Figure 35

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
2	3	27	24	52	75	77	33	102	15	127	18
3	6	28	27	53	33	78	39	103	26	128	24
4	18	29	48	54	51	79	21	104	12	129	3
5	22	30	43	55	25	80	21	105	6	130	42
6	21	31	30	56	36	81	45	106	3	131	45
7	35	32	60	57	51	82	24	107	10	132	14
8	30	33	29	58	45	83	24	108	24	133	12
9	45	34	51	59	39	84	33	109	9	134	39
10	38	35	36	60	74	85	18	110	9	135	15
11	37	36	58	61	66	86	24	111	9	137	18
12	55	37	18	62	82	87	36	112	30	138	45
13	51	38	24	63	63	88	24	113	62	139	48
14	46	39	42	64	51	89	33	114	44	140	15
15	57	40	18	65	39	90	42	115	30	141	12
16	36	41	24	66	45	91	23	116	71	142	27
17	46	42	12	67	42	92	41	117	18	143	33
18	13	43	9	68	51	93	37	118	21	144	6
19	10	44	9	69	93	94	39	119	21	145	6
20	4	45	6	70	105	95	72	120	36	146	6
21	27	46	18	71	68	96	126	121	15	147	12
22	9	47	30	72	69	97	111	122	9	148	3
23	6	48	36	73	51	98	126	123	12	149	6
24	34	49	42	74	72	99	75	124	24	150	6
25	27	50	36	75	45	100	44	125	18	151	15
26	30	51	88	76	33	101	67	126	22	152	3

WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC, 77 DEG F,TPH-1011

This sample size summary is applicable to figures 36 thru 39.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
154	12	181	12
155	3	182	12
156	9	183	18
157	9	184	12
158	12	185	18
159	3	186	24
160	6	187	18
161	18	188	18
162	3	189	12
163	3	190	6
164	3	192	7
165	3	193	5
166	6	194	6
167	12	197	3
168	3		
170	3		
171	9		
172	6		
174	12		
175	3		
176	3		
177	6		
178	15		
179	12		
180	15		

WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC, 77 DEG F,TPH-1011

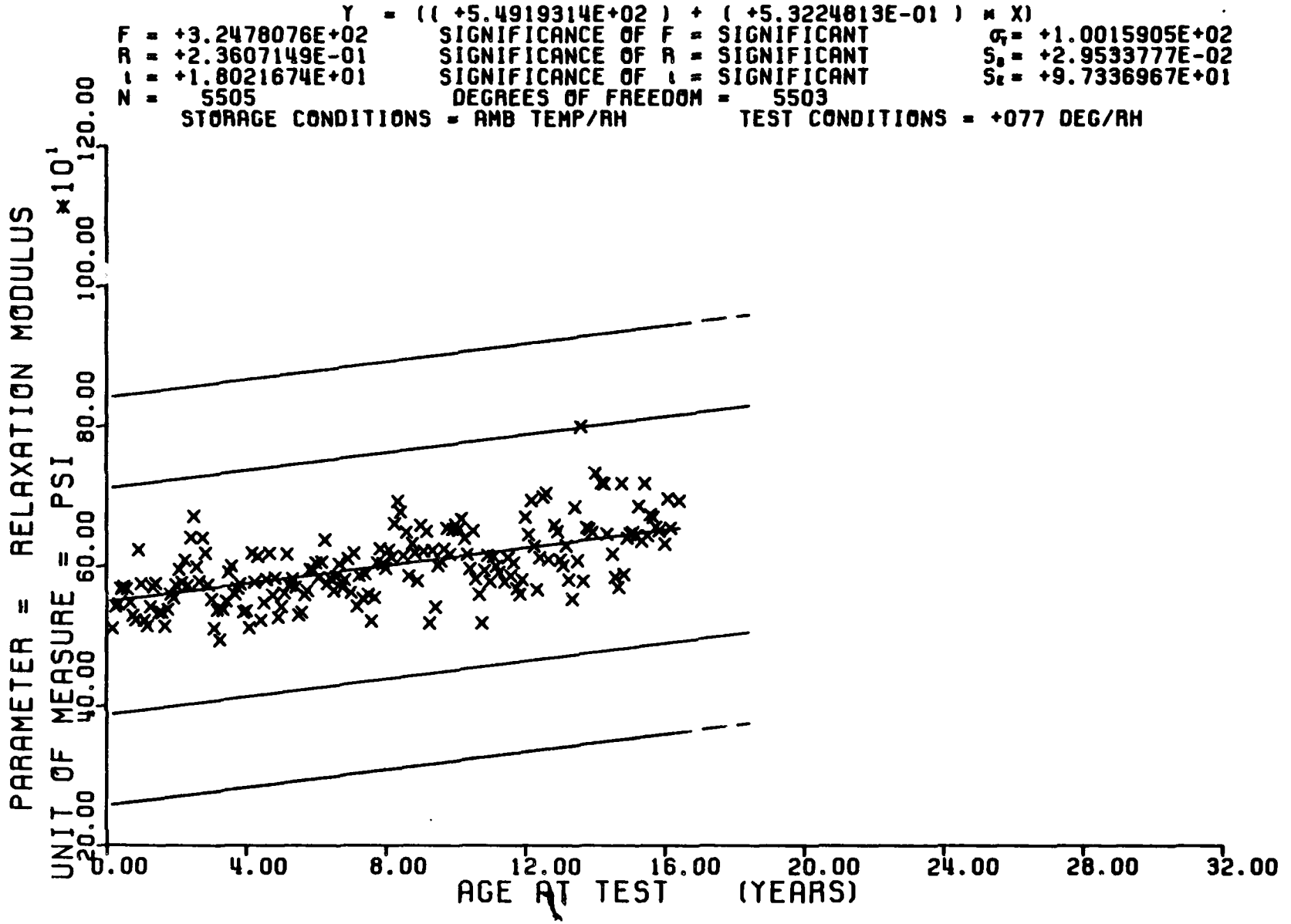
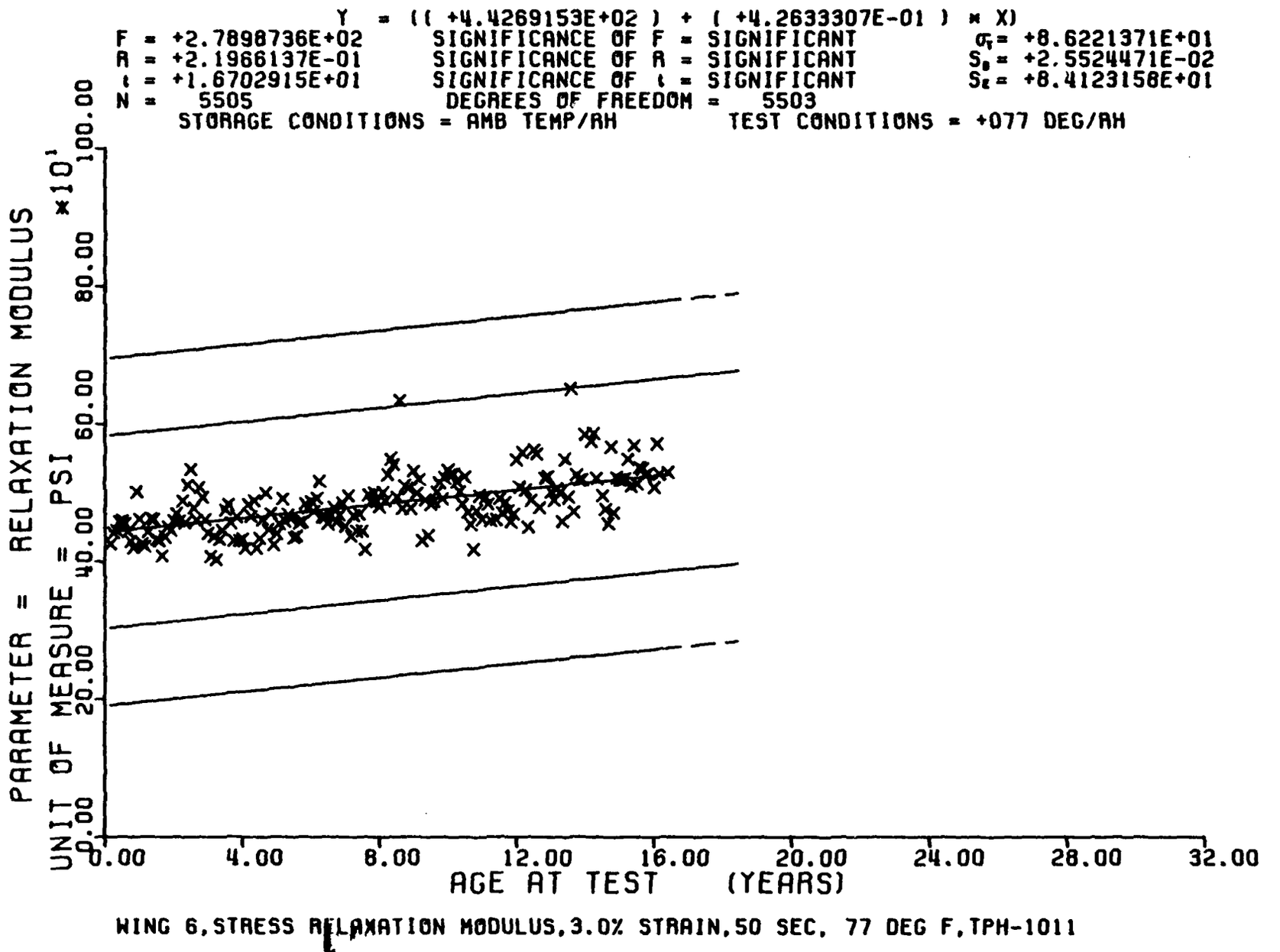
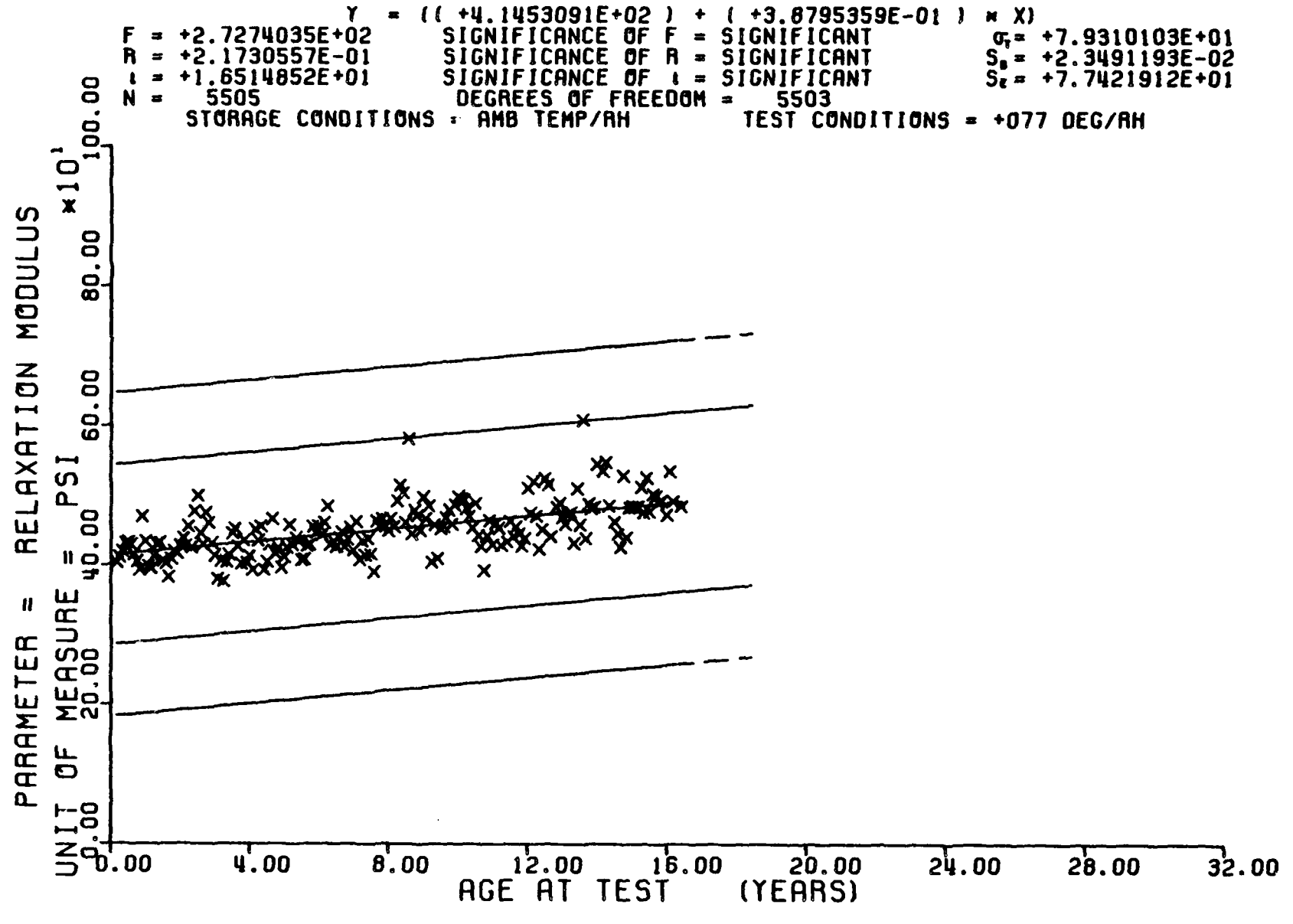

Y = ((+5.4919314E+02) + (+5.3224813E-01) * X)
F = +3.2478076E+02 SIGNIFICANCE OF F = SIGNIFICANT σr = +1.0015905E+02
R = +2.3607149E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.9533777E-02
t = +1.8021674E+01 SIGNIFICANCE OF t = SIGNIFICANT Se = +9.7336967E+01
N = 5505 DEGREES OF FREEDOM = 5503
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +077 DEG/RH
PARAMETER = RELAXATION MODULUS
UNIT OF MEASURE = PSI *10¹
120.00
100.00
80.00
60.00
40.00
20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC, 77 DEG F,TPH-1011

Figure 36



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC, 77 DEG F, TPH-1011

Figure 37



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 77 DEG F, TPH-1011

Figure 38

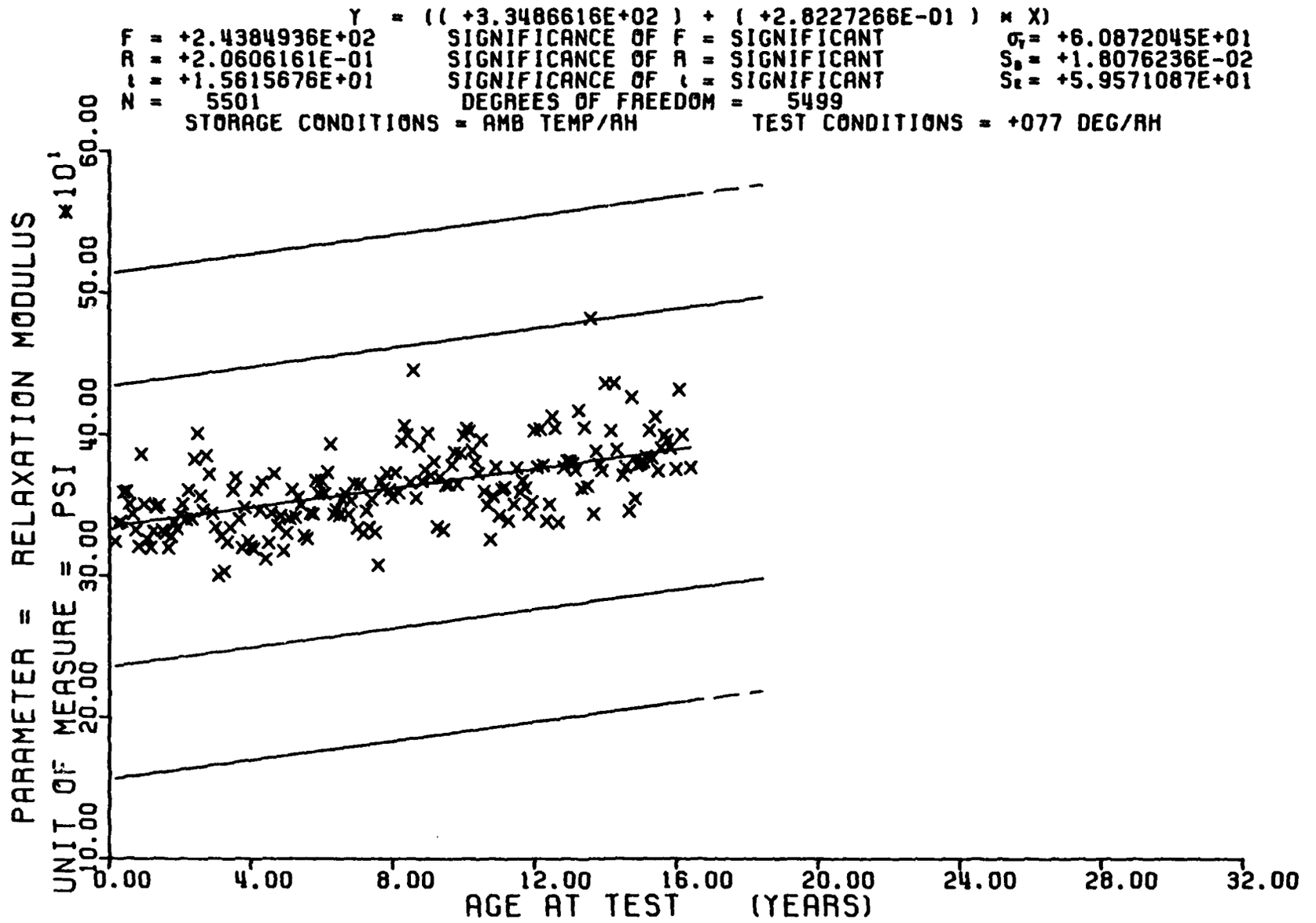

Y = ((+3.3486616E+02) + (+2.8227266E-01) * X)
F = +2.4384936E+02 SIGNIFICANCE OF F = SIGNIFICANT σr = +6.0872045E+01
R = +2.0606161E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.8076236E-02
t = +1.5615676E+01 SIGNIFICANCE OF t = SIGNIFICANT St = +5.9571087E+01
N = 5501 DEGREES OF FREEDOM = 5499
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +077 DEG/RH
PARAMETER = RELAXATION MODULUS
UNIT OF MEASURE = PSI *10¹
60.00
50.00
40.00
30.00
20.00
10.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,1000 SEC, 77 DEG F,TPH-1011

Figure 39

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
12	3	43	9	68	12	93	21	118	21	143	30
13	3	44	3	69	24	94	21	119	21	144	12
15	6	45	9	70	27	95	27	120	36	145	6
17	15	46	6	71	48	96	60	121	18	146	6
19	6	47	9	72	42	97	57	122	9	147	12
20	3	48	3	73	24	98	60	123	15	148	3
21	9	49	6	74	42	99	39	124	21	149	9
22	6	50	27	75	36	100	21	125	15	150	6
23	3	51	57	76	29	101	24	126	24	151	15
24	6	52	45	77	33	102	9	127	17	152	6
25	9	53	12	78	36	103	21	128	21	154	12
26	9	54	28	79	18	104	9	129	3	155	3
28	3	55	27	80	24	105	9	130	42	156	6
29	9	56	27	81	39	106	3	131	48	157	12
30	9	57	31	82	27	107	8	132	9	158	9
31	3	58	24	83	18	108	21	133	15	159	3
32	9	59	12	84	21	109	9	134	39	160	9
33	9	60	15	85	12	110	9	135	12	161	18
35	15	61	20	86	18	111	9	136	6	162	3
36	24	62	48	87	18	112	33	137	21	163	3
38	6	63	21	88	14	113	51	138	51	164	3
39	9	64	33	89	18	114	44	139	51	165	3
40	9	65	9	90	30	115	30	140	21	166	6
41	12	66	12	91	24	116	36	141	18	167	12
42	6	67	6	92	24	117	21	142	27	168	3

WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC,100 DEG F,TPH-1011

This sample size summary is applicable to figures 40 thru 43.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP
170	3
171	9
172	6
174	12
175	3
176	3
177	6
178	15
179	6
180	15
181	9
182	9
183	18
184	9
185	18
186	24
187	18
188	18
189	12
190	6
192	6
193	6
194	6
197	3

WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC,100 DEG F,TPH-1011

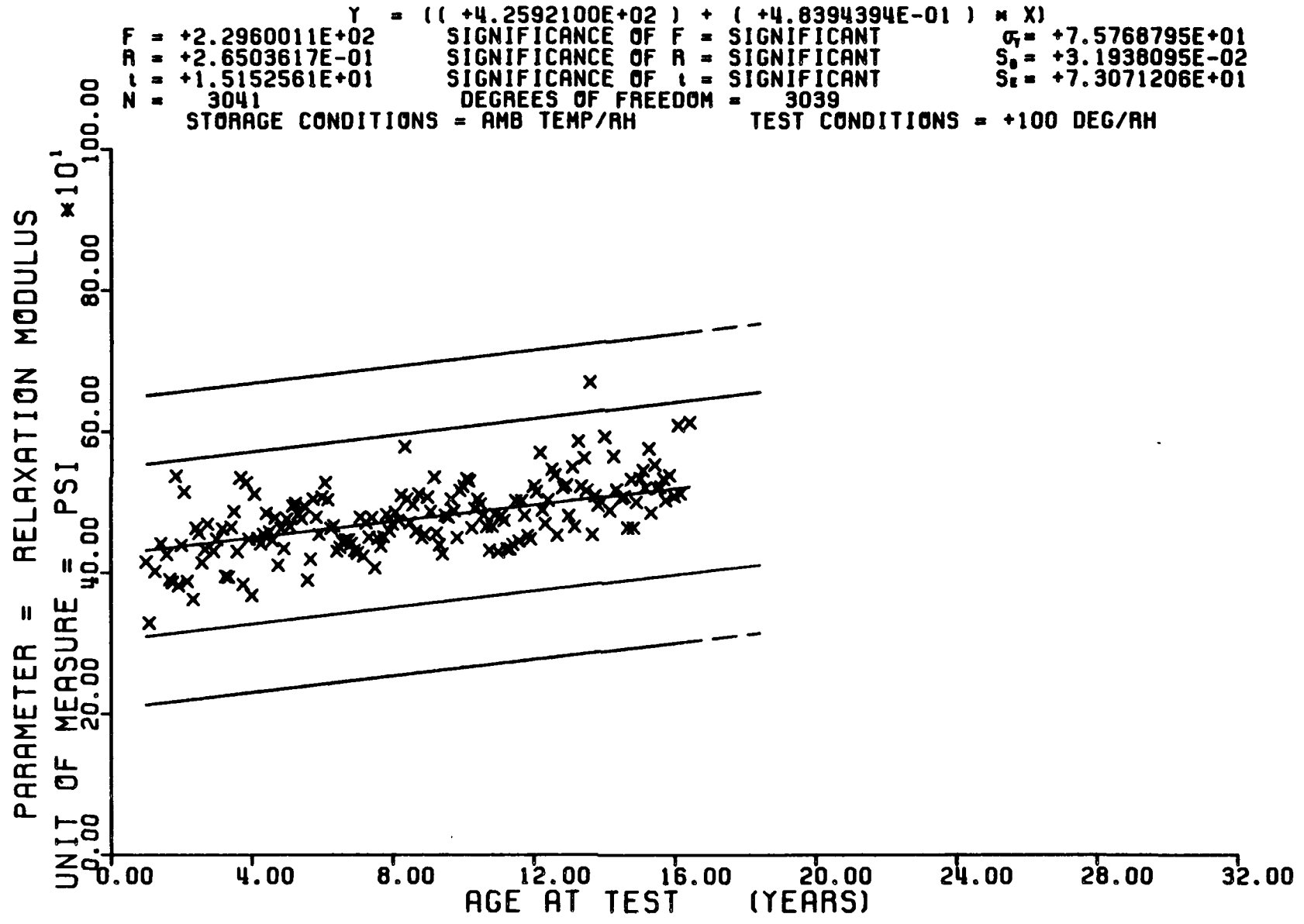
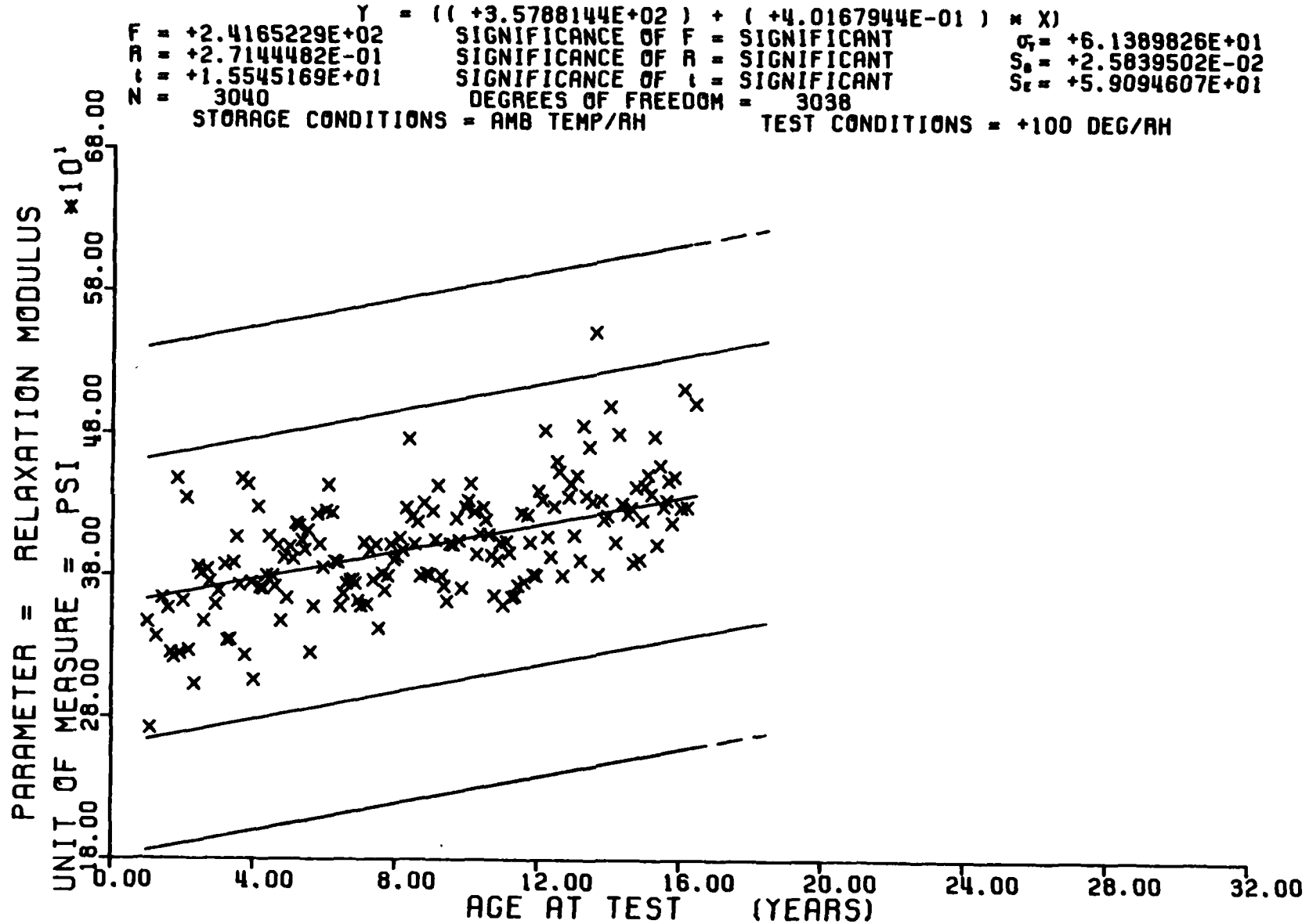
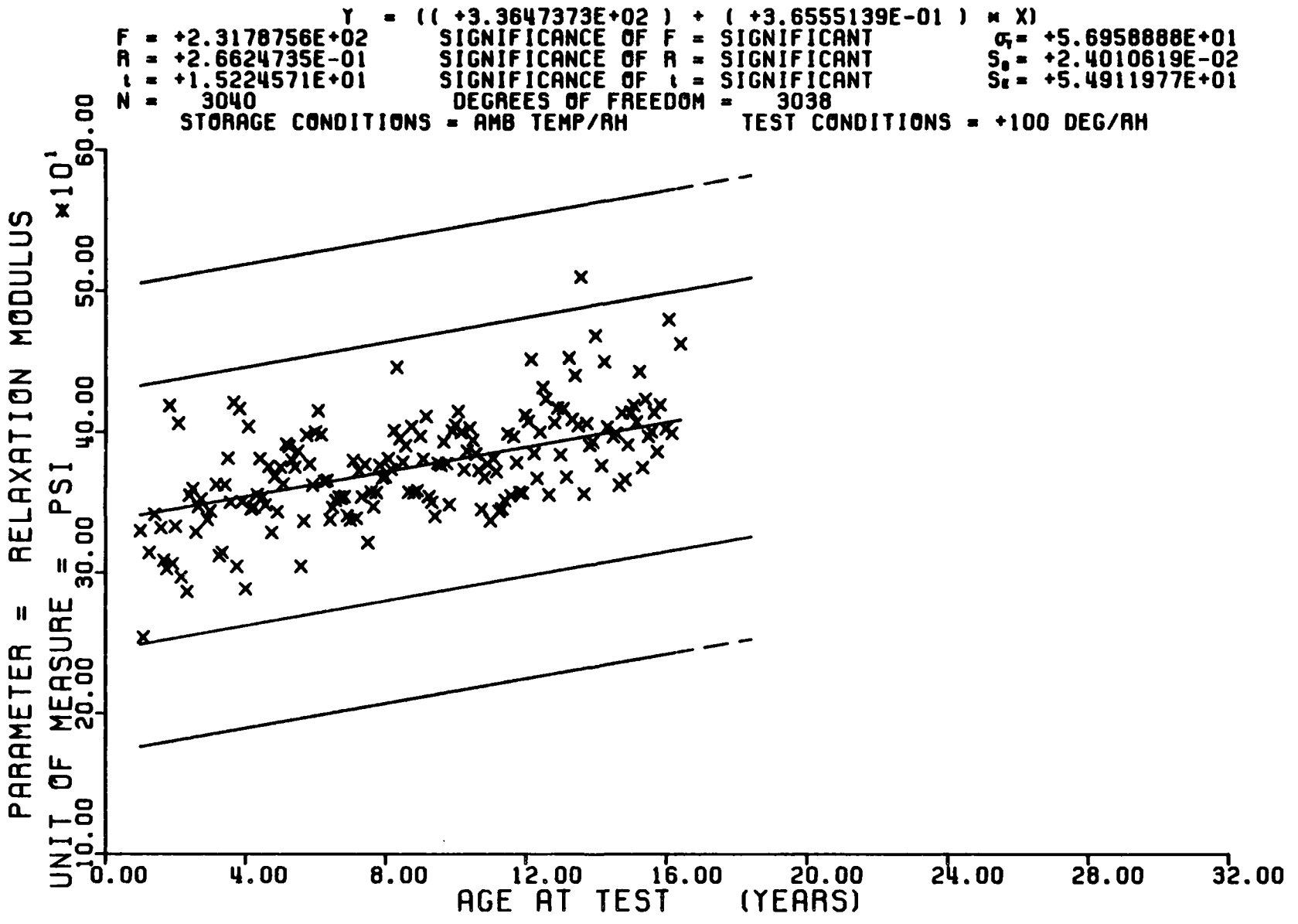

Y = ((+4.2592100E+02) + (+4.8394394E-01) * X)
F = +2.2960011E+02 SIGNIFICANCE OF F = SIGNIFICANT σY = +7.5768795E+01
R = +2.6503617E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +3.1938095E-02
t = +1.5152561E+01 SIGNIFICANCE OF t = SIGNIFICANT St = +7.3071206E+01
N = 3041 DEGREES OF FREEDOM = 3039
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +100 DEG/RH
PARAMETER = RELAXATION MODULUS
UNIT OF MEASURE = PSI *10¹
100.00
80.00
60.00
40.00
20.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC,100 DEG F,TPH-1011

Figure 40



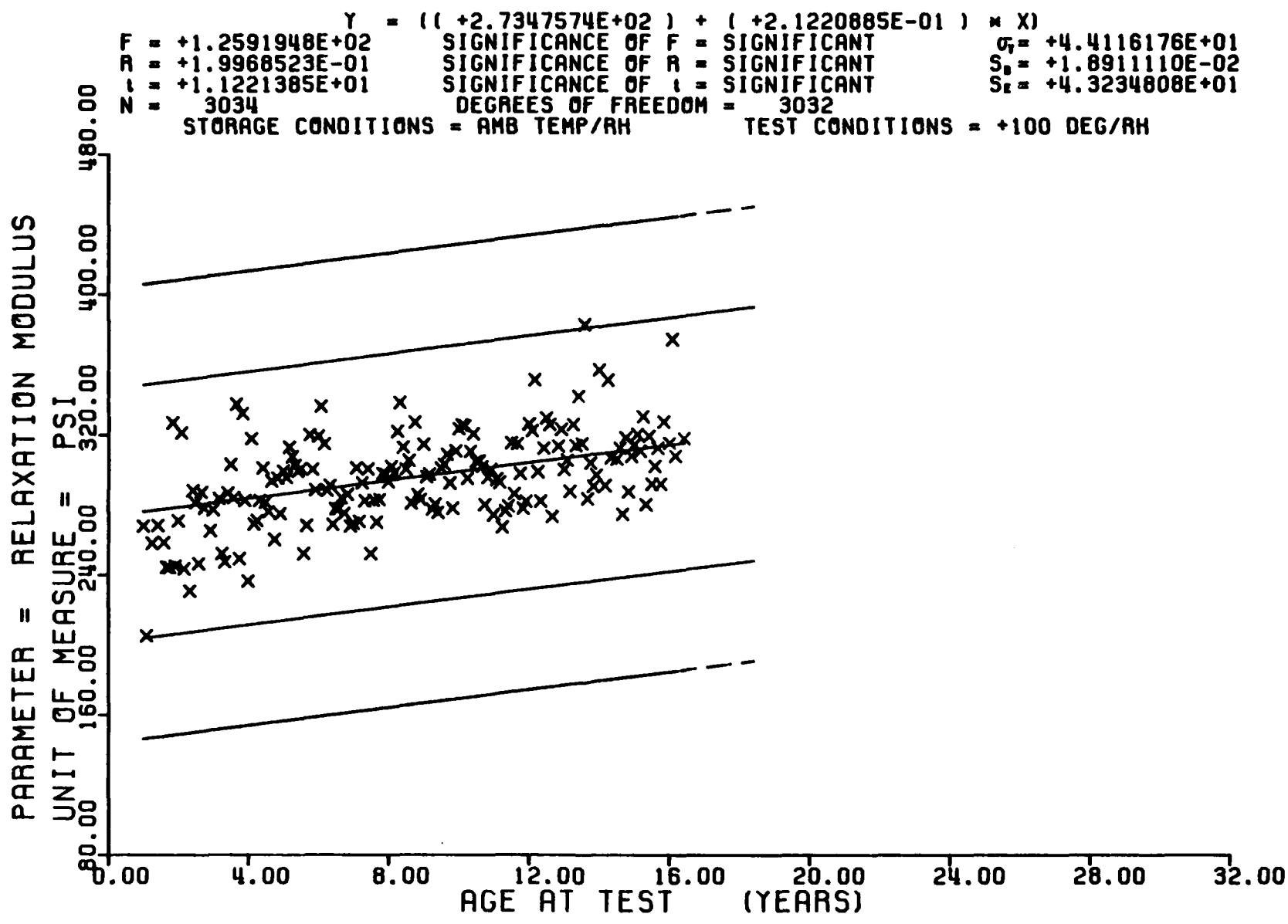
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,50 SEC,100 DEG F,TPH-1011

Figure 41



WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,100 SEC,100 DEG F,TPH-1011

Figure 42



WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,1000 SEC,100 DEG F,TPH-1011

Figure 43

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	34	57	59	42	84	33	109	9	134	39
9	9	35	36	60	65	85	15	110	12	135	12
10	6	36	51	61	75	86	21	111	9	136	6
12	24	37	21	62	72	87	24	112	30	137	21
13	27	38	18	63	60	88	18	113	51	138	42
14	9	39	48	64	57	89	24	114	44	139	54
15	27	40	18	65	36	90	24	115	27	140	12
16	15	41	21	66	51	91	36	116	39	141	15
17	39	42	15	67	36	92	36	117	21	142	27
18	10	43	9	68	48	93	42	118	27	143	33
19	6	44	9	69	96	94	45	119	21	144	9
20	6	45	3	70	90	95	65	120	33	145	6
21	18	46	12	71	75	96	120	121	21	146	6
22	6	47	30	72	69	97	95	122	9	147	12
23	9	48	39	73	45	98	132	123	15	148	3
24	33	49	39	74	74	99	69	124	21	149	9
25	30	50	42	75	48	100	45	125	15	150	6
26	30	51	72	76	39	101	54	126	24	151	15
27	21	52	72	77	36	102	8	127	17	152	6
28	27	53	42	78	36	103	21	128	18	153	3
29	48	54	42	79	17	104	6	129	2	154	9
30	45	55	36	80	23	105	9	130	36	155	3
31	33	56	42	81	33	106	3	131	54	156	9
32	57	57	51	82	30	107	6	132	9	157	9
33	27	58	57	83	27	108	24	133	15	158	9

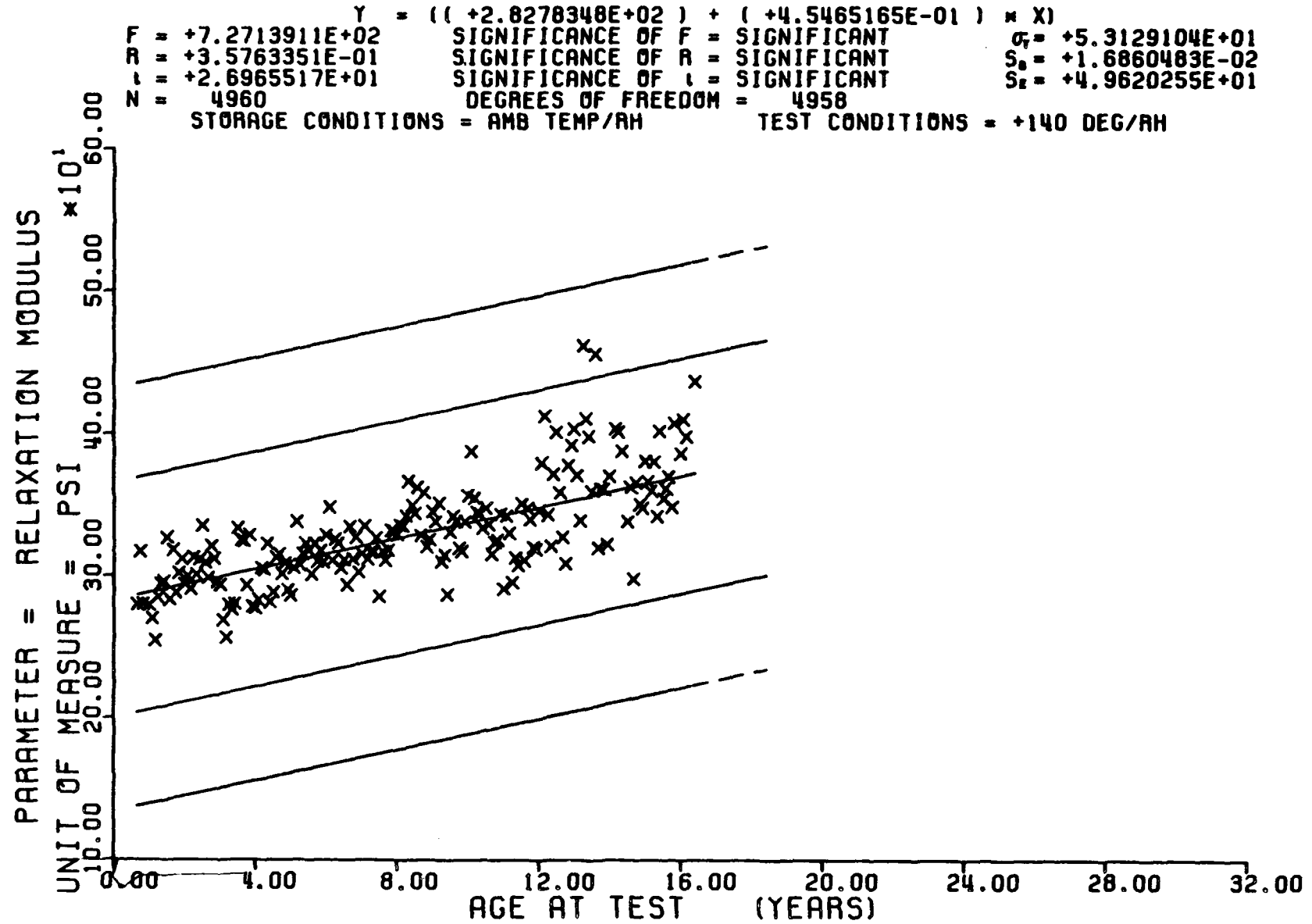
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC,140 DEG F,TPH-1011

This sample size summary is applicable to figures 44 thru 47.

*** SAMPLE SIZE SUMMARY ***

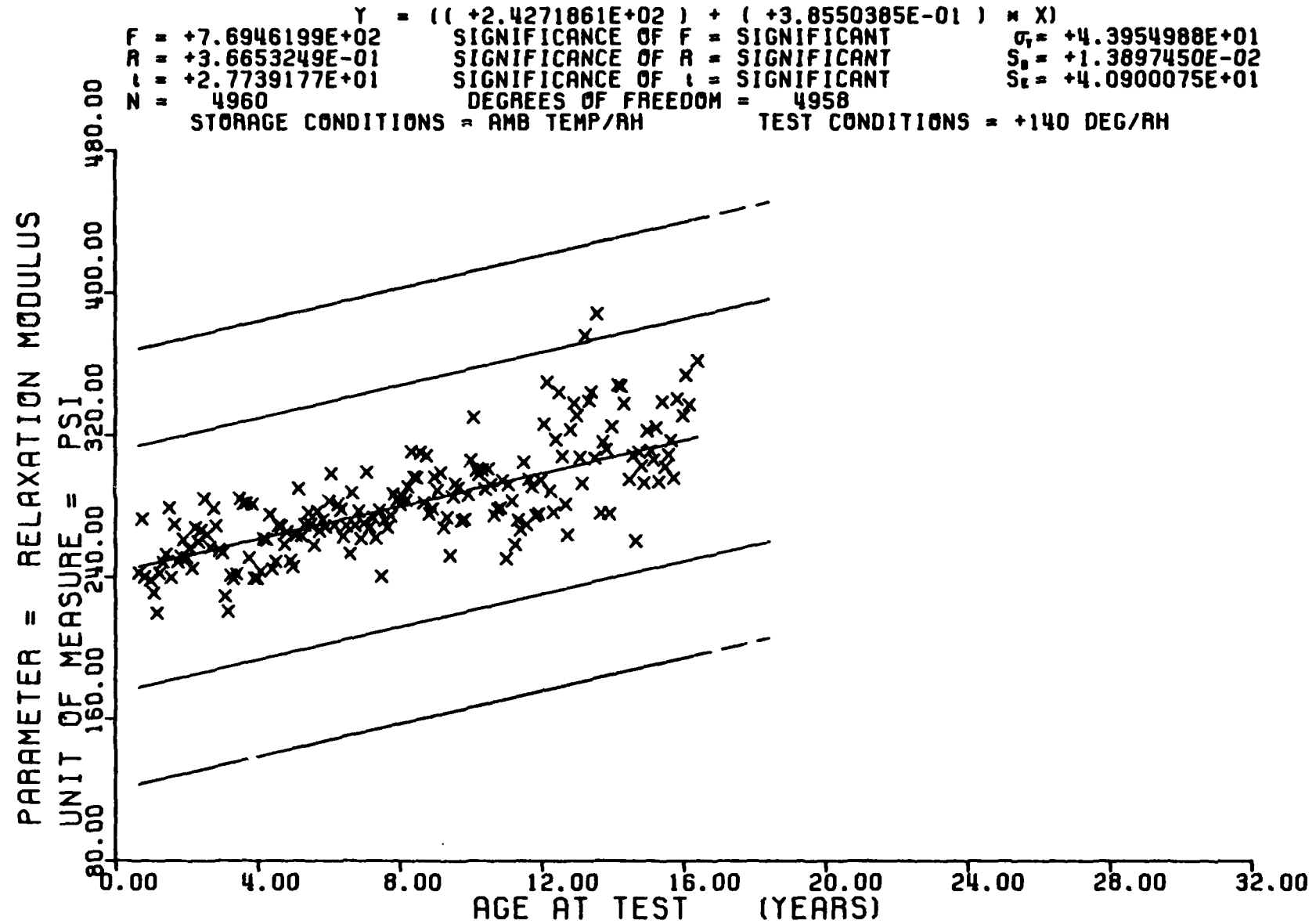
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
159	3	186	24
160	6	187	18
161	22	188	18
162	3	189	12
163	3	190	6
164	3	192	6
165	3	193	6
166	6	194	6
167	12	197	3
168	3		
170	3		
171	9		
172	6		
174	12		
175	3		
176	3		
177	6		
178	15		
179	6		
180	15		
181	9		
182	9		
183	18		
184	9		
185	18		

WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC,140 DEG F,TPH-1011



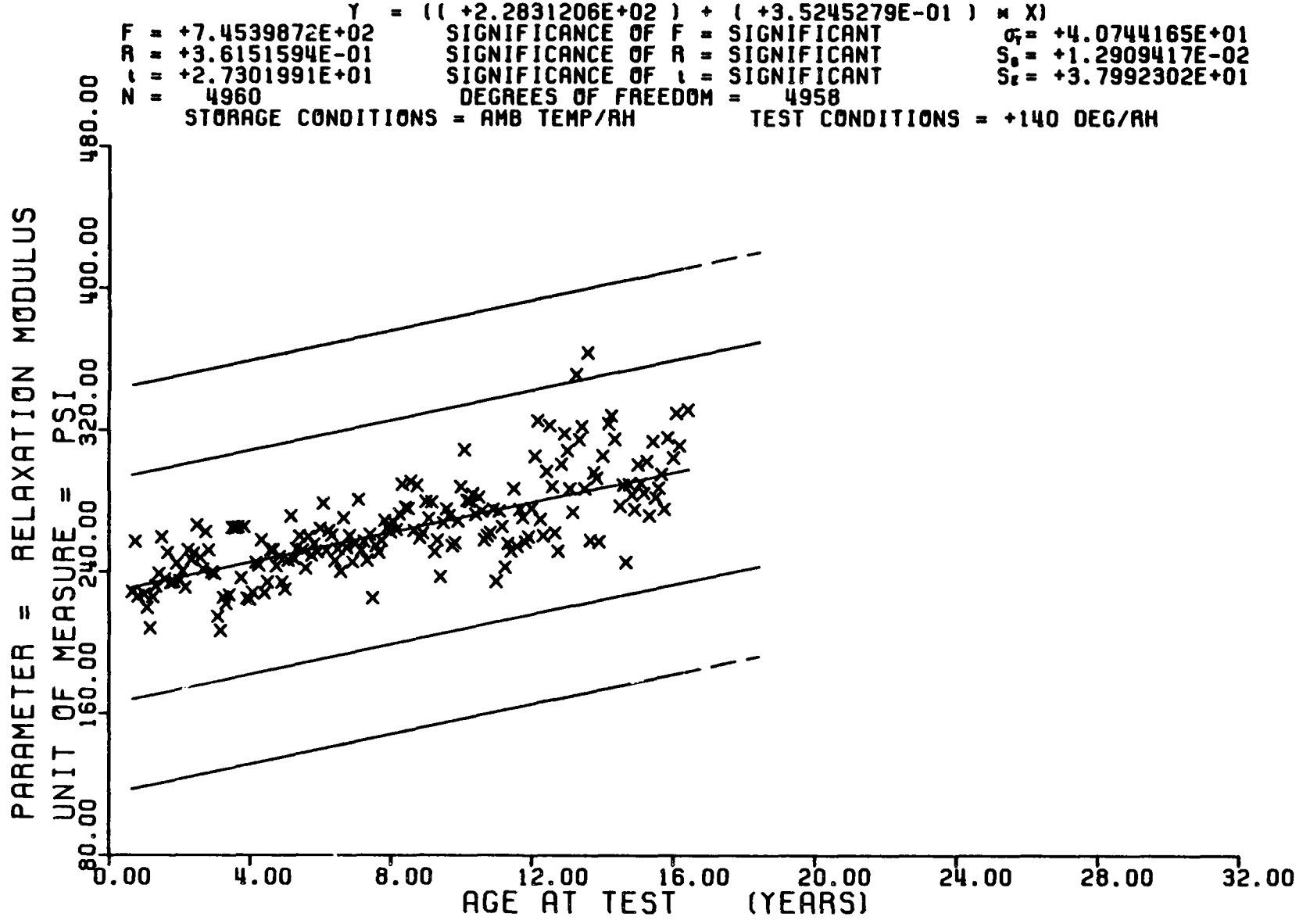
WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 140 DEG F, TPH-1011

Figure 44



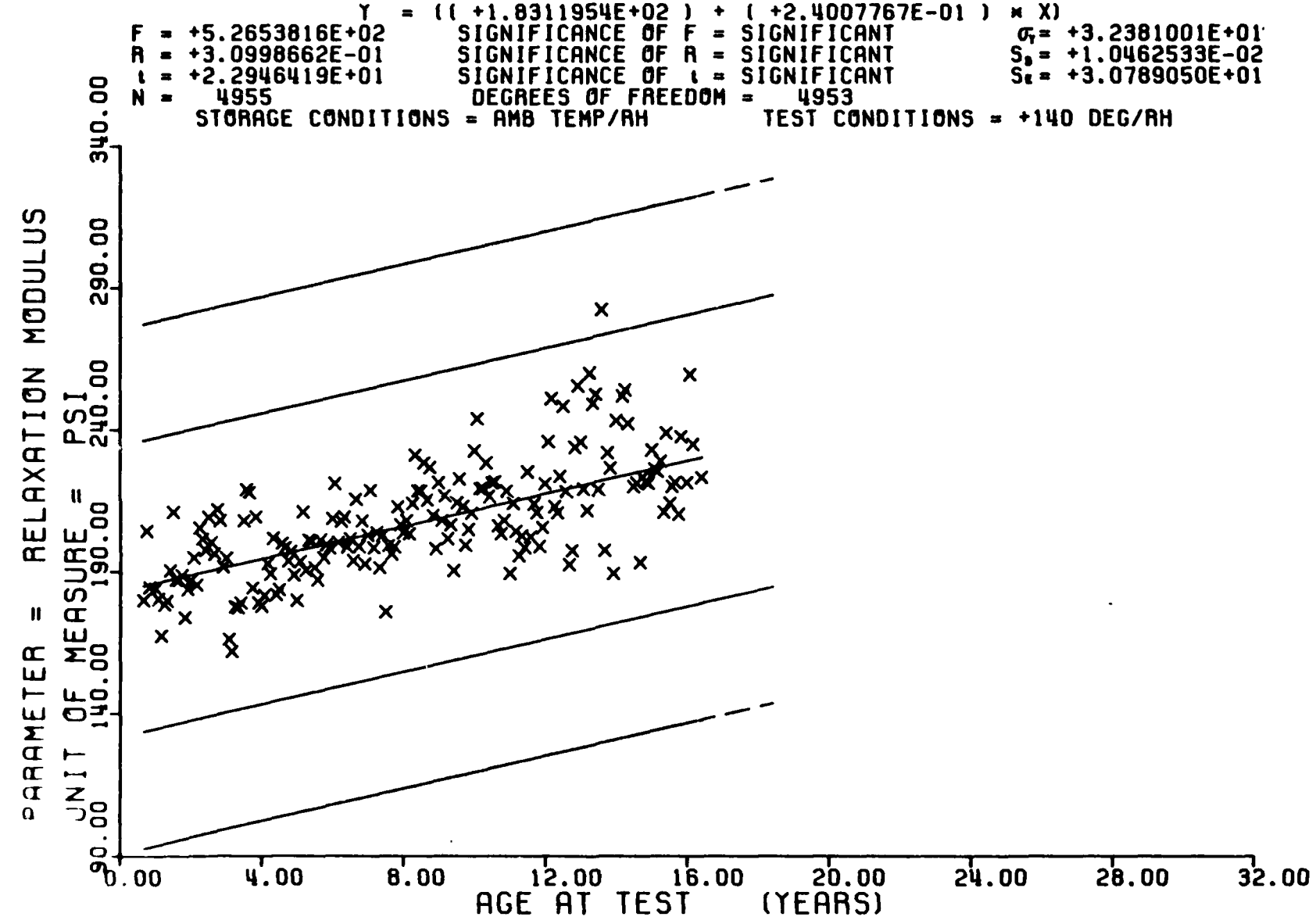
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,50 SEC,140 DEG F,TPH-1011

Figure 45



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 140 DEG F, TPH-1011

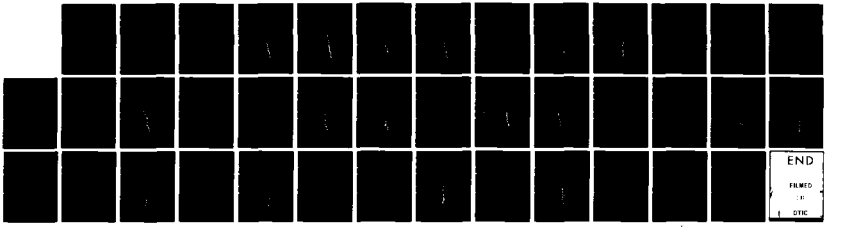
Figure 46

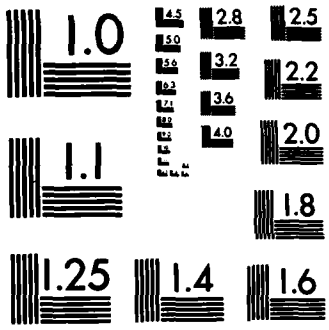


WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC, 140 DEG F, TPH-1011

Figure 47

AD-A123 315 PROPELLANT SURVEILLANCE REPORT LGM-30 F & G STAGE 1 - 2/2
PHASE G SERIES I TP-H.. (U) OGDEN AIR LOGISTICS CENTER
HILL AFB UT PROPELLANT ANALYSIS LA.. J A THOMPSON
UNCLASSIFIED NOV 82 MANPA-476(82) F/G 21/9.2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	34	51	59	42	84	36	109	9	134	27
9	9	35	33	60	63	85	12	110	9	135	12
10	6	36	57	61	69	86	24	111	6	136	6
12	24	37	21	62	73	87	27	112	36	137	21
13	24	38	18	63	66	88	33	113	54	138	60
14	12	39	48	64	51	89	33	114	41	139	50
15	24	40	18	65	39	90	39	115	24	140	12
16	18	41	21	66	51	91	36	116	39	141	15
17	33	42	18	67	36	92	36	117	21	142	26
18	18	43	9	68	51	93	42	118	20	143	39
19	9	44	6	69	90	94	41	119	15	144	12
20	6	45	6	70	92	95	66	120	32	145	3
21	18	46	6	71	51	96	132	121	12	146	6
22	9	47	30	72	78	97	93	122	9	147	9
23	9	48	42	73	50	98	138	123	15	148	6
24	30	49	42	74	60	99	72	124	21	149	12
25	35	50	42	75	51	100	44	125	15	150	6
26	24	51	63	76	45	101	52	126	24	151	15
27	24	52	71	77	27	102	9	127	17	152	6
28	26	53	42	78	42	103	21	128	15	153	3
29	50	54	45	79	18	104	6	129	6	154	6
30	42	55	36	80	24	105	12	130	30	155	6
31	33	56	42	81	36	106	3	131	54	156	12
32	54	57	54	82	30	107	6	132	12	157	9
33	30	58	57	83	27	108	27	133	15	158	9

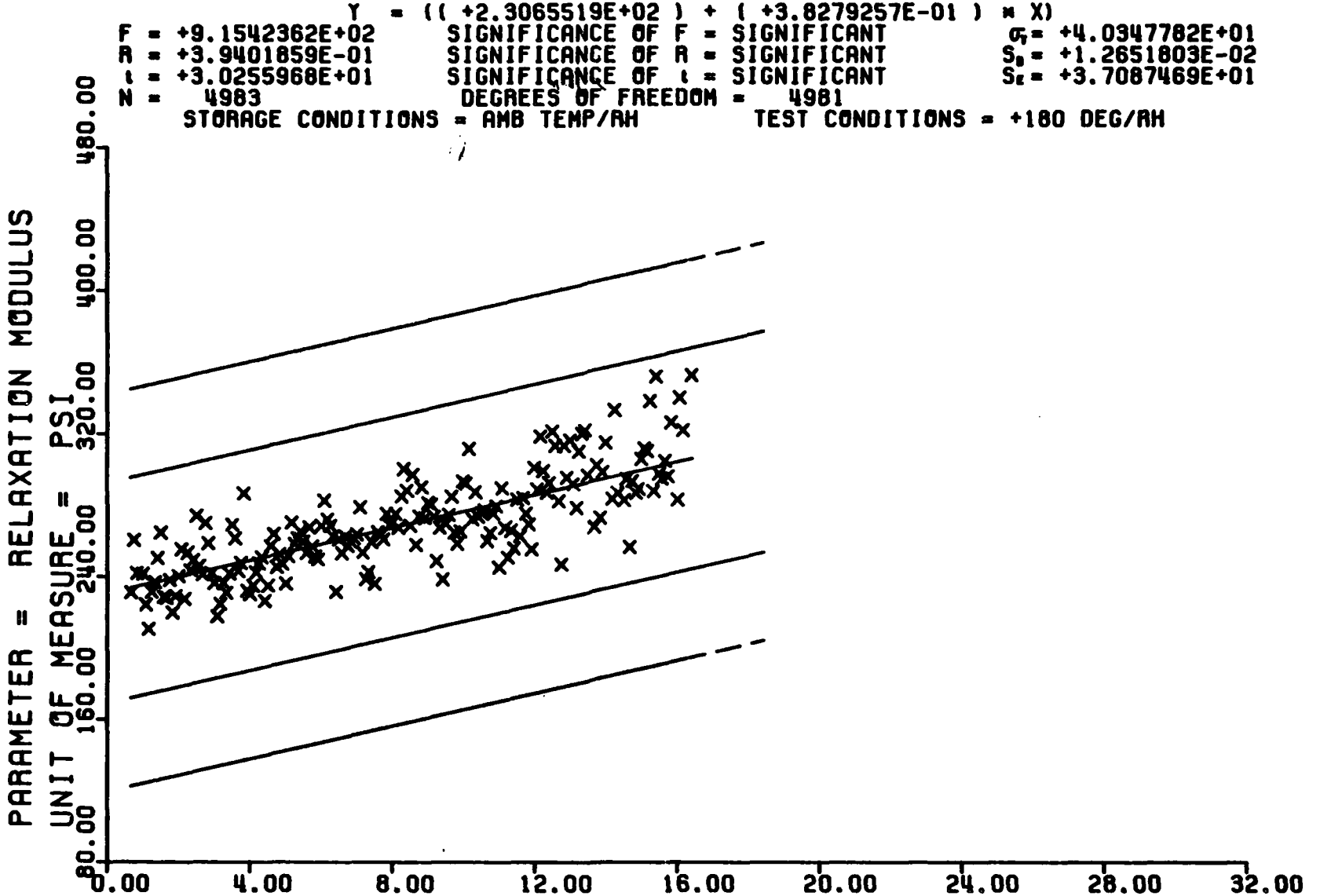
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC,180 DEG F,TPH-1011

This sample size summary is applicable to figures 48 thru 51.

*** SAMPLE SIZE SUMMARY ***

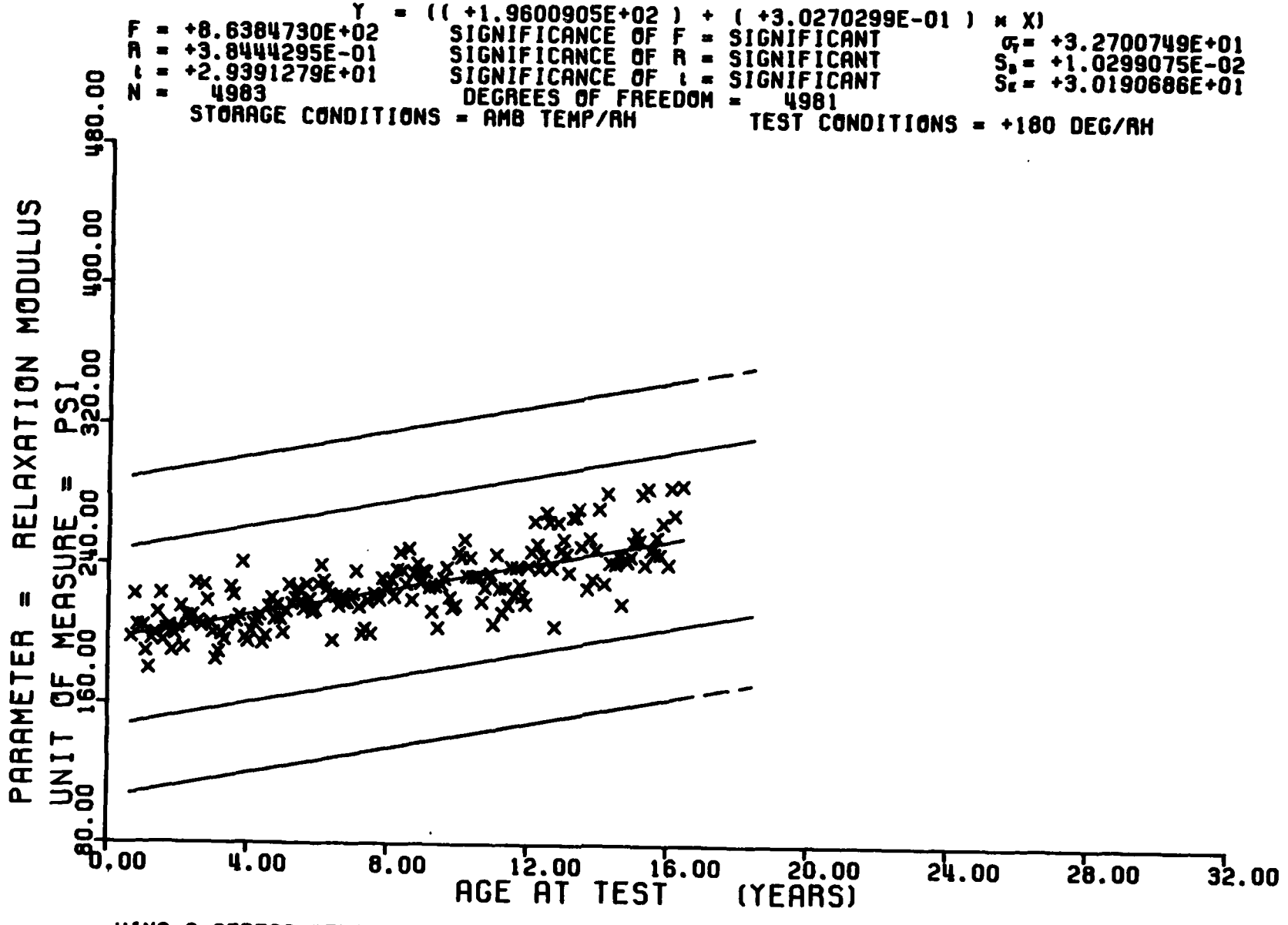
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
159	3	187	15
160	9	188	15
161	21	189	12
162	3	190	6
164	3	192	6
165	3	193	6
166	6	194	6
167	12	197	3
168	3		
170	3		
171	9		
172	6		
174	12		
175	3		
176	3		
177	6		
178	15		
179	6		
180	15		
181	9		
182	9		
183	15		
184	9		
185	18		
186	24		

WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC,180 DEG F,TPH-1011



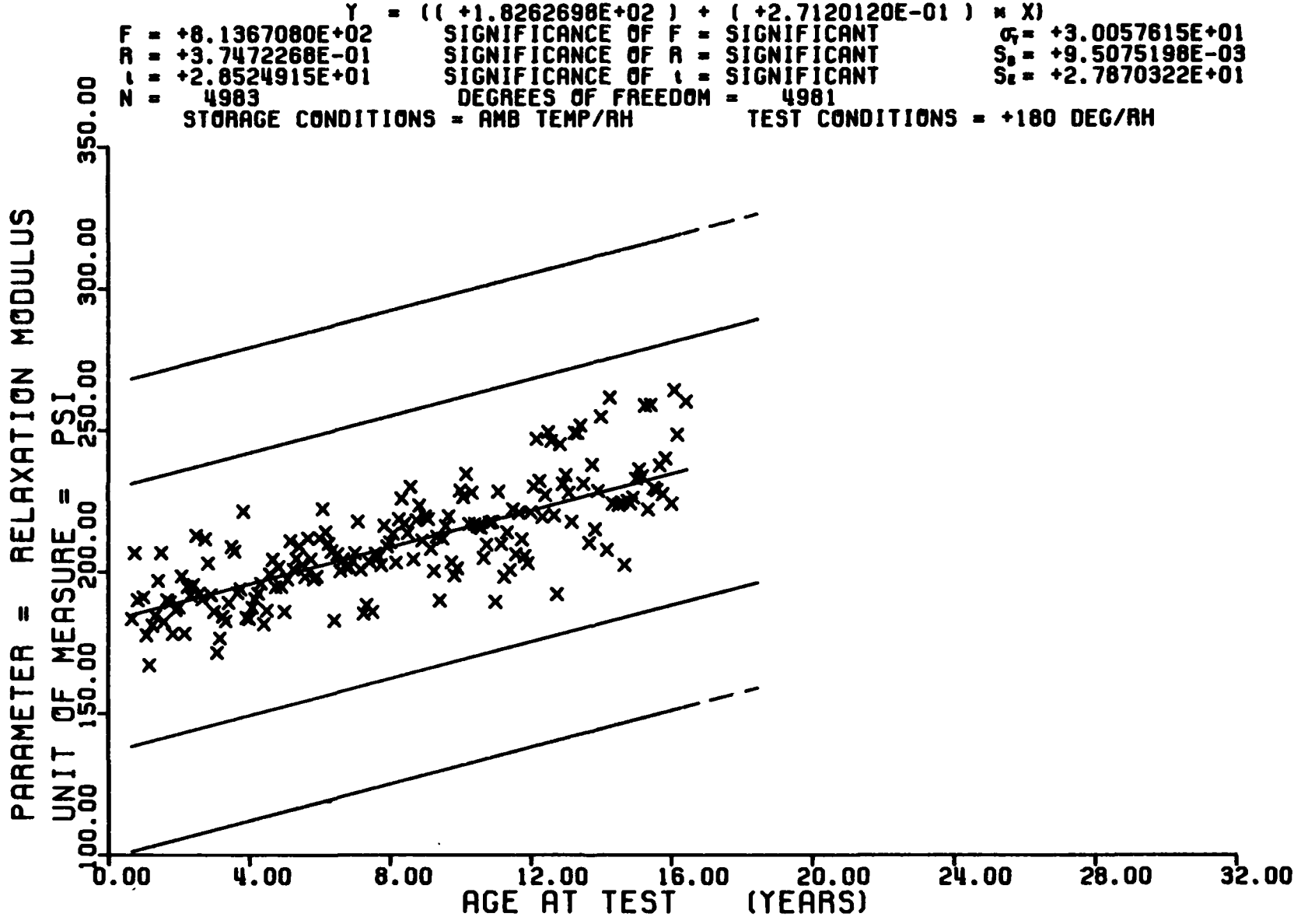
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,10 SEC,180 DEG F,TPH-1011

Figure 48



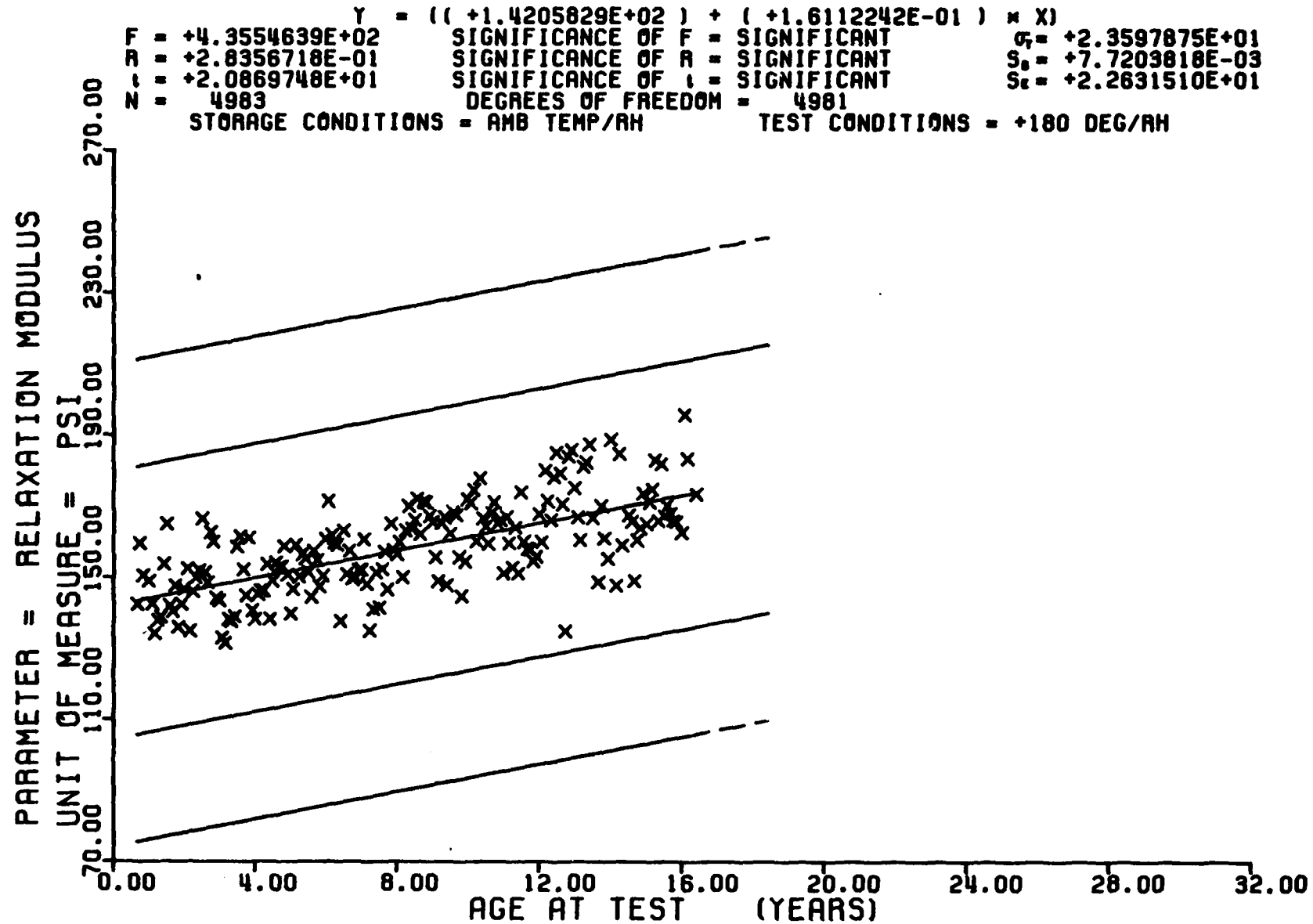
WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,50 SEC,180 DEG F,TPH-1011

Figure 49



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 180 DEG F, TPH-101

Figure 50



WING 6,STRESS RELAXATION MODULUS,3.0% STRAIN,1000 SEC,180 DEG F,TPH-1011

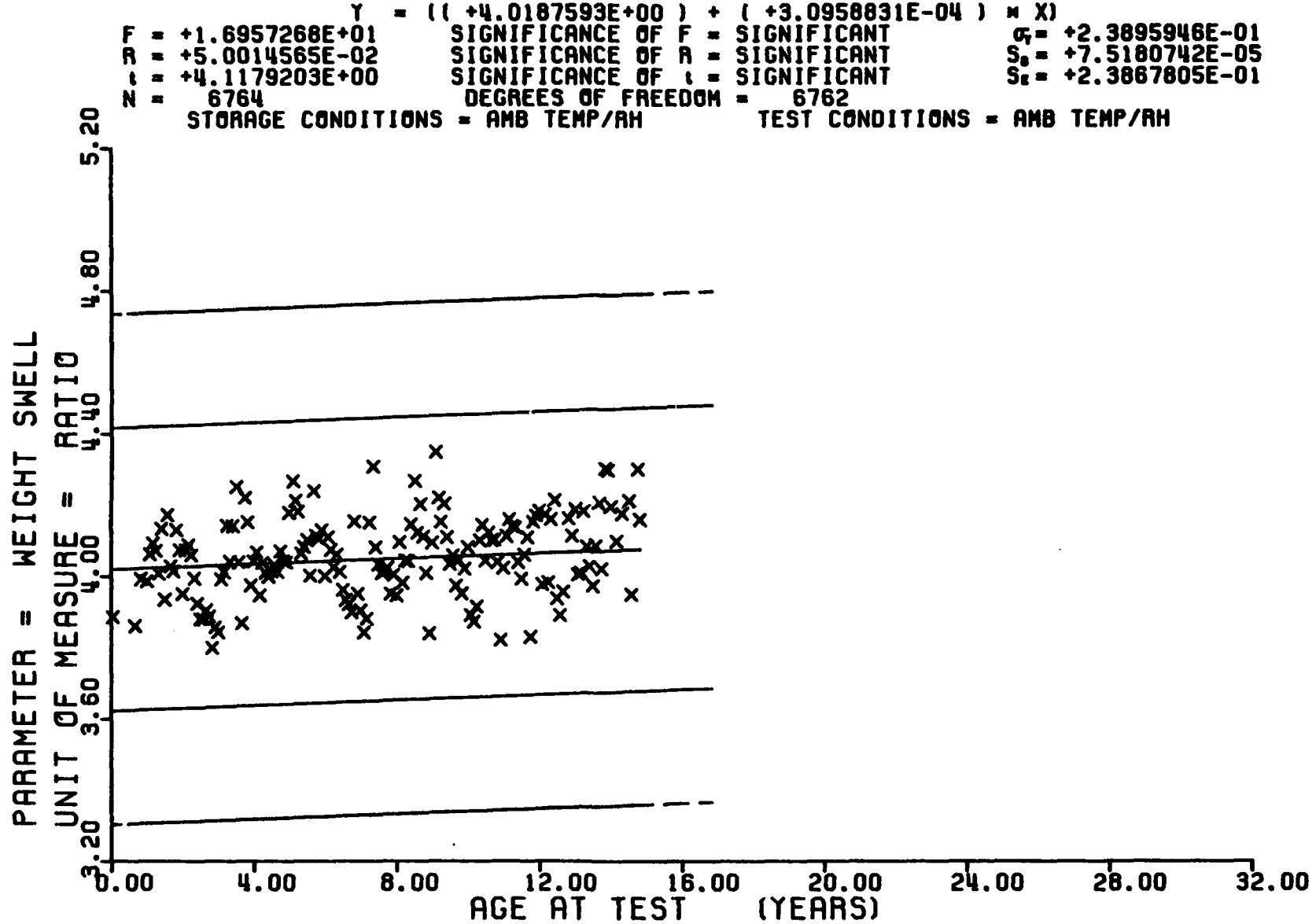
Figure 51

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	3	34	48	59	48	84	16	109	4	134	56
8	4	35	64	60	73	85	13	110	24	135	48
10	24	36	47	61	63	86	16	111	60	136	40
12	12	37	56	62	74	87	16	112	24	137	19
13	32	38	47	63	74	88	28	113	31	138	38
14	36	39	36	64	80	89	44	114	80	139	126
15	20	40	45	65	90	90	44	115	88	140	34
16	20	41	36	66	39	91	48	116	69	141	8
17	28	42	26	67	52	92	32	117	40	142	16
18	32	43	20	68	72	93	23	118	124	143	12
19	52	44	4	69	75	94	36	119	106	144	15
20	12	45	12	70	89	95	39	120	108	145	15
21	32	46	19	71	84	96	43	121	76	146	7
22	28	47	36	72	104	97	48	122	64	147	4
23	24	48	36	73	64	98	47	123	12	148	20
24	8	49	44	74	126	99	126	124	12	149	12
25	40	50	24	75	82	100	110	125	4	150	16
26	56	51	60	76	70	101	98	126	11	151	15
27	32	52	114	77	63	102	54	127	28	152	12
28	44	53	120	78	62	103	40	128	20	154	20
29	43	54	46	79	38	104	15	129	52	155	4
30	44	55	50	80	50	105	4	130	28	156	15
31	72	56	70	81	39	106	28	131	74	157	4
32	64	57	47	82	20	107	20	132	132	158	12
33	52	58	93	83	40	108	28	133	86	159	7
										160	19
										161	8
										162	7
										163	15
										164	3
										165	8
								175	8	166	4
								177	4	167	4
								178	4	168	7
										170	15
										172	16
										174	8

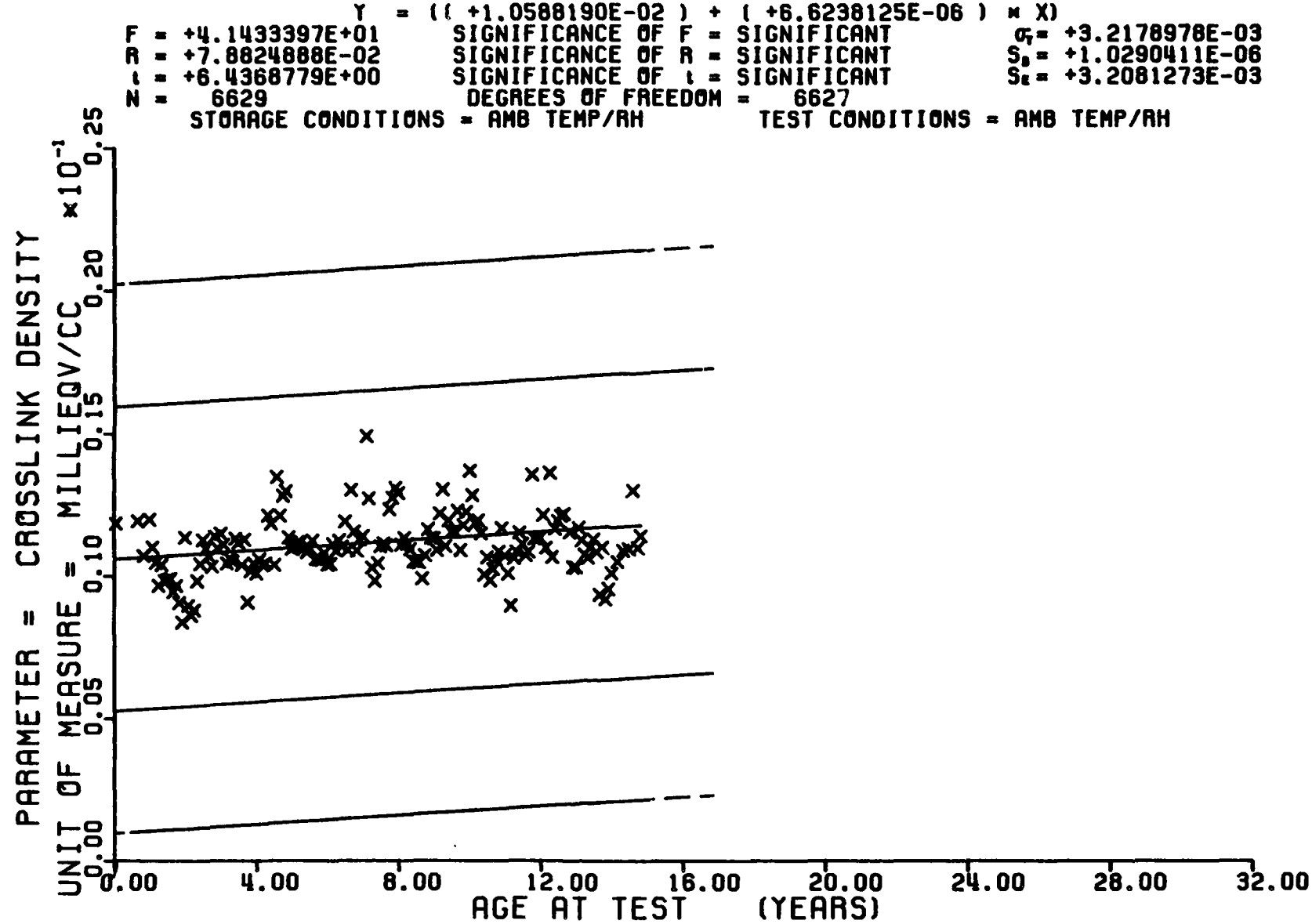
STAGE 1, WING 6, TP-H1011, SOL GEL, GEL SHELL RATIO

This sample size summary is applicable to figures 52 and 53.



STAGE 1, WING 6, TP-H1011, SOL GEL, GEL SWELL RATIO

Figure 52



STAGE 1, WING 6, TP-H1011, SOL GEL, CROSSLINK DENSITY

Figure 53

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
2	3	27	29	53	78	78	75	103	12	128	15
3	15	28	34	54	51	79	20	104	15	129	9
4	10	29	59	55	46	80	54	105	6	130	60
5	11	30	31	56	80	81	51	106	15	131	102
6	23	31	51	57	84	82	32	107	15	132	21
7	18	32	67	58	60	83	44	108	9	133	24
8	24	33	56	59	40	84	40	109	39	134	39
9	24	34	61	60	53	85	36	110	36	135	24
10	40	35	39	61	72	86	30	111	18	136	12
11	24	36	33	62	99	87	42	112	28	137	30
12	40	37	43	63	94	88	32	113	114	138	87
13	51	38	29	64	92	89	61	114	53	139	63
14	52	39	48	65	40	90	57	115	57	140	29
15	52	40	36	66	43	91	54	116	51	141	21
16	63	41	12	67	68	92	53	117	110	142	24
17	15	42	24	68	82	93	49	118	37	143	75
18	65	43	24	69	71	94	61	119	63	144	9
19	28	44	16	70	92	95	69	120	84	145	13
20	28	46	31	71	52	96	77	121	51	146	18
21	17	47	30	72	42	97	125	122	12	147	6
22	22	48	37	73	85	98	105	123	9	148	6
23	11	49	64	74	78	99	74	124	3	149	17
24	19	50	17	75	74	100	66	125	9	150	3
25	64	51	68	76	73	101	57	126	3	151	9
26	22	52	96	77	46	102	20	127	3	152	9

STAGE 1 WING 6 TP-H 1011 CONSTANT STRAIN

This sample size summary is applicable to figure 54.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
153	6	180	21
154	9	181	12
155	6	182	6
156	5	183	12
157	12	184	12
158	3	185	12
159	12	186	12
160	9	187	15
161	15	188	21
162	6	189	15
163	3	190	9
165	3	192	6
166	11	193	3
167	9	194	3
168	7	195	3
169	9	197	3
170	3		
171	6		
172	9		
173	3		
174	6		
175	15		
176	3		
177	9		
178	12		

STAGE 1 WING 6 TP-H 101. CONSTANT STRAIN

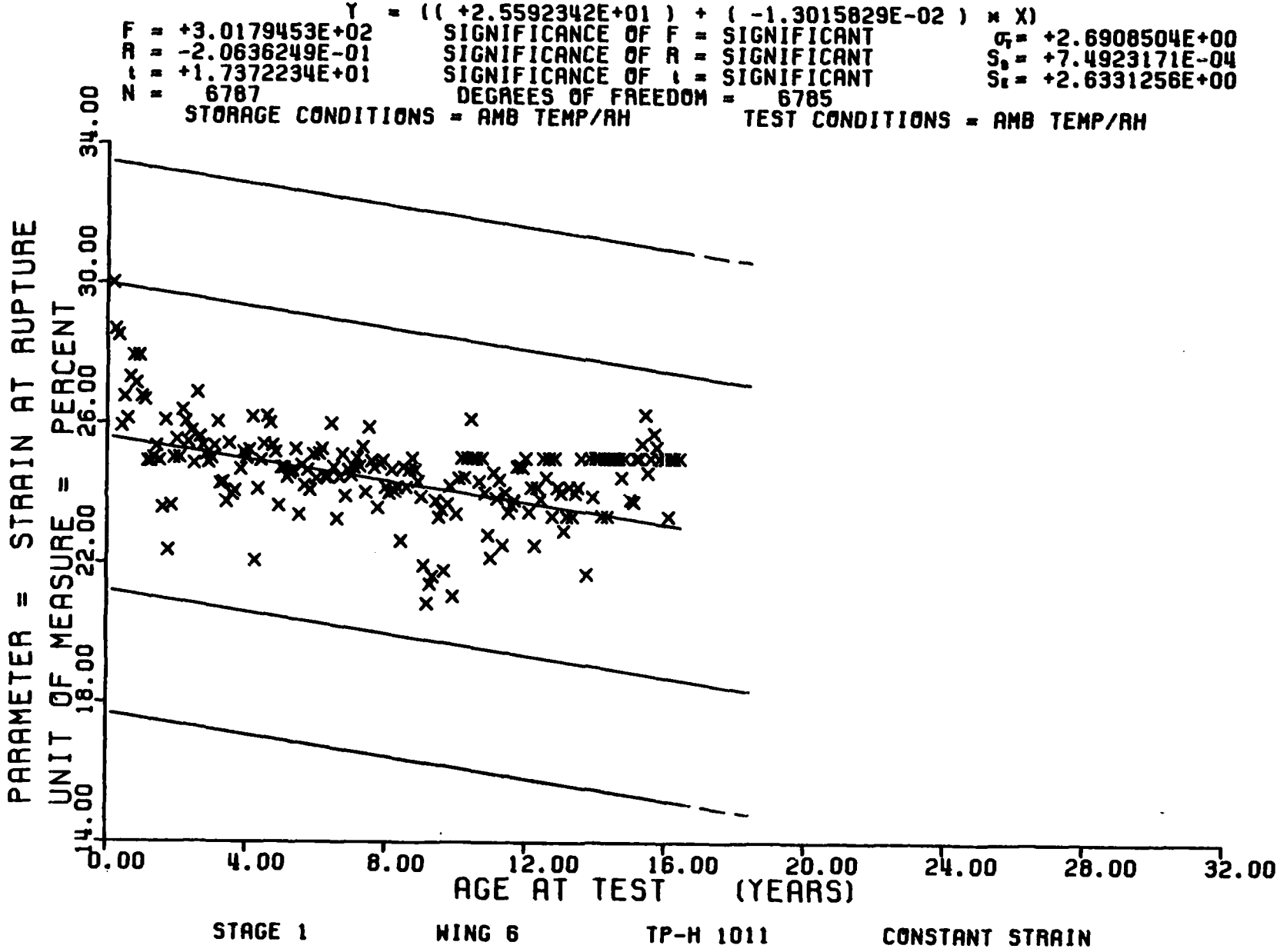

Y = ((+2.5592342E+01) + (-1.3015829E-02) x X)
F = +3.0179453E+02 SIGNIFICANCE OF F = SIGNIFICANT
R = -2.0636249E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +1.7372234E+01 SIGNIFICANCE OF t = SIGNIFICANT
N = 6787 DEGREES OF FREEDOM = 6785
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σ = +2.6908504E+00
S = +7.4923171E-04
S = +2.6331256E+00
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = PERCENT
34.00
30.00
26.00
22.00
18.00
14.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 WING 6 TP-H 1011 CONSTANT STRAIN

Figure 54

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	3	32	30	58	54	83	18	108	3	133	33
6	3	33	24	59	33	84	30	109	9	134	21
7	3	34	27	60	51	85	27	110	24	135	27
8	3	35	27	61	57	86	12	111	15	136	36
9	12	36	45	62	57	87	27	112	30	137	18
10	6	37	18	63	81	88	36	113	54	138	67
12	18	38	21	64	42	89	42	114	27	139	48
13	15	39	45	65	12	90	51	115	9	140	30
14	6	40	15	66	42	91	33	116	42	141	18
15	30	41	21	67	45	92	51	117	39	142	12
16	18	42	6	68	60	93	48	118	9	143	9
17	15	43	6	69	98	94	48	119	12	144	21
18	15	44	9	70	108	95	54	120	33	145	6
19	6	46	12	71	51	96	39	121	9	146	15
20	2	47	9	72	57	97	123	122	6	147	3
21	15	48	51	73	54	98	111	123	21	148	6
22	3	49	45	74	54	99	84	124	21	149	9
24	27	50	51	75	48	100	75	125	27	150	15
25	21	51	66	76	36	101	39	126	21	151	6
26	39	52	78	77	27	102	15	127	39	152	6
27	12	53	33	78	27	103	12	128	36	154	12
28	21	54	33	79	21	104	18	129	27	155	3
29	24	55	51	80	15	105	3	130	45	156	12
30	21	56	66	81	41	106	18	131	44	157	12
31	39	57	69	82	18	107	18	132	21	158	6

STAGE 1 WING 6 TP-H 1011 SHORE A, 10 SECOND HARDNESS

This sample size summary is applicable to figure 55.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
159	6	185	9
160	12	186	30
161	12	187	15
162	6	188	12
163	3	189	12
164	3	190	6
165	3	191	6
166	6	192	3
167	3	194	3
168	15	195	3
169	6	197	3
170	3		
171	9		
172	9		
173	6		
175	12		
176	6		
177	15		
178	6		
179	3		
180	21		
181	3		
182	9		
183	12		
184	9		

STAGE 1 WING 6 TP-H 1011 SHORE A, 10 SECOND HARDNESS

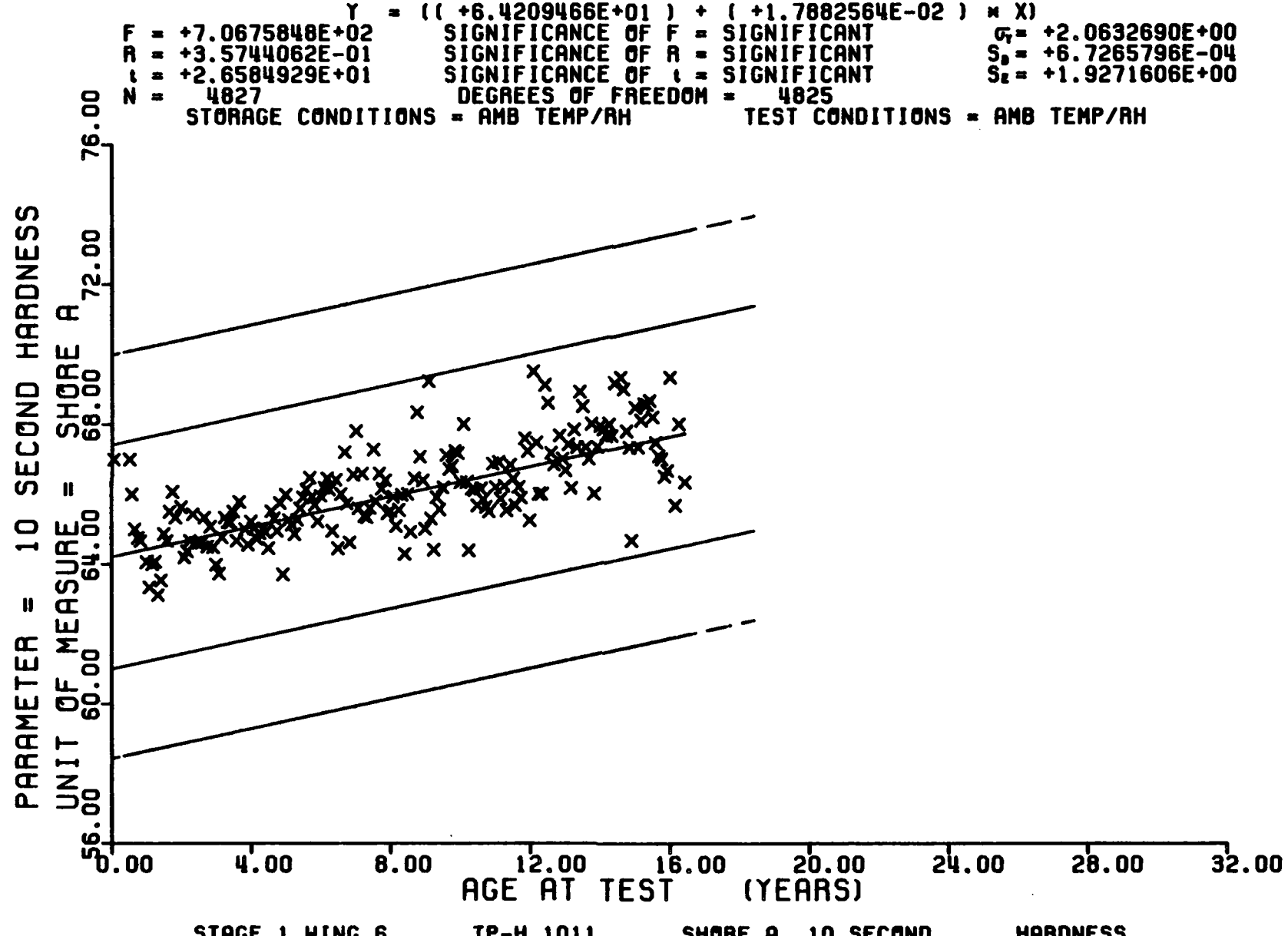

Y = ((+6.4209466E+01) + (+1.7882564E-02) * X)
F = +7.0675848E+02 SIGNIFICANCE OF F = SIGNIFICANT σr = +2.0632690E+00
R = +3.5744062E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +6.7265796E-04
t = +2.6584929E+01 SIGNIFICANCE OF t = SIGNIFICANT St = +1.9271606E+00
N = 4827 DEGREES OF FREEDOM = 4825
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = 10 SECOND HARDNESS
UNIT OF MEASURE = SHORE A
76.00
72.00
68.00
64.00
60.00
56.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 WING 6 TP-H 1011 SHORE A, 10 SECOND HARDNESS

Figure 55

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	34	46	59	39	84	35	109	10	134	37
9	10	35	39	60	60	85	19	110	24	135	14
10	7	36	30	61	53	86	17	111	9	136	13
12	22	37	53	62	45	87	12	112	15	137	11
13	29	38	18	63	40	88	12	113	18	138	64
14	15	39	32	64	33	89	25	114	22	139	47
15	21	40	27	65	53	90	21	115	22	140	14
15	24	41	21	66	41	91	29	116	19	141	6
17	9	42	15	67	40	92	21	117	110	142	30
18	33	43	12	68	49	93	42	118	65	143	49
19	4	44	19	69	115	94	57	119	15	144	6
20	8	45	9	70	67	95	67	120	19	146	6
21	25	46	3	71	35	96	84	121	11	147	4
22	24	47	56	72	40	97	82	122	28	148	4
23	12	48	32	73	35	98	140	123	8	149	8
24	18	49	42	74	29	99	93	124	23	150	8
25	42	50	31	75	41	100	49	125	31	151	6
26	15	51	67	76	31	101	43	126	9	152	4
27	27	52	72	77	20	102	14	127	31	154	4
28	24	53	92	78	37	103	13	128	26	155	4
29	39	54	24	79	15	104	9	129	10	156	6
30	42	55	48	80	32	105	13	130	41	157	2
31	48	56	51	81	55	106	17	131	56	158	4
32	54	57	45	82	15	107	8	132	20	159	2
33	39	58	69	83	28	108	10	133	14	160	2

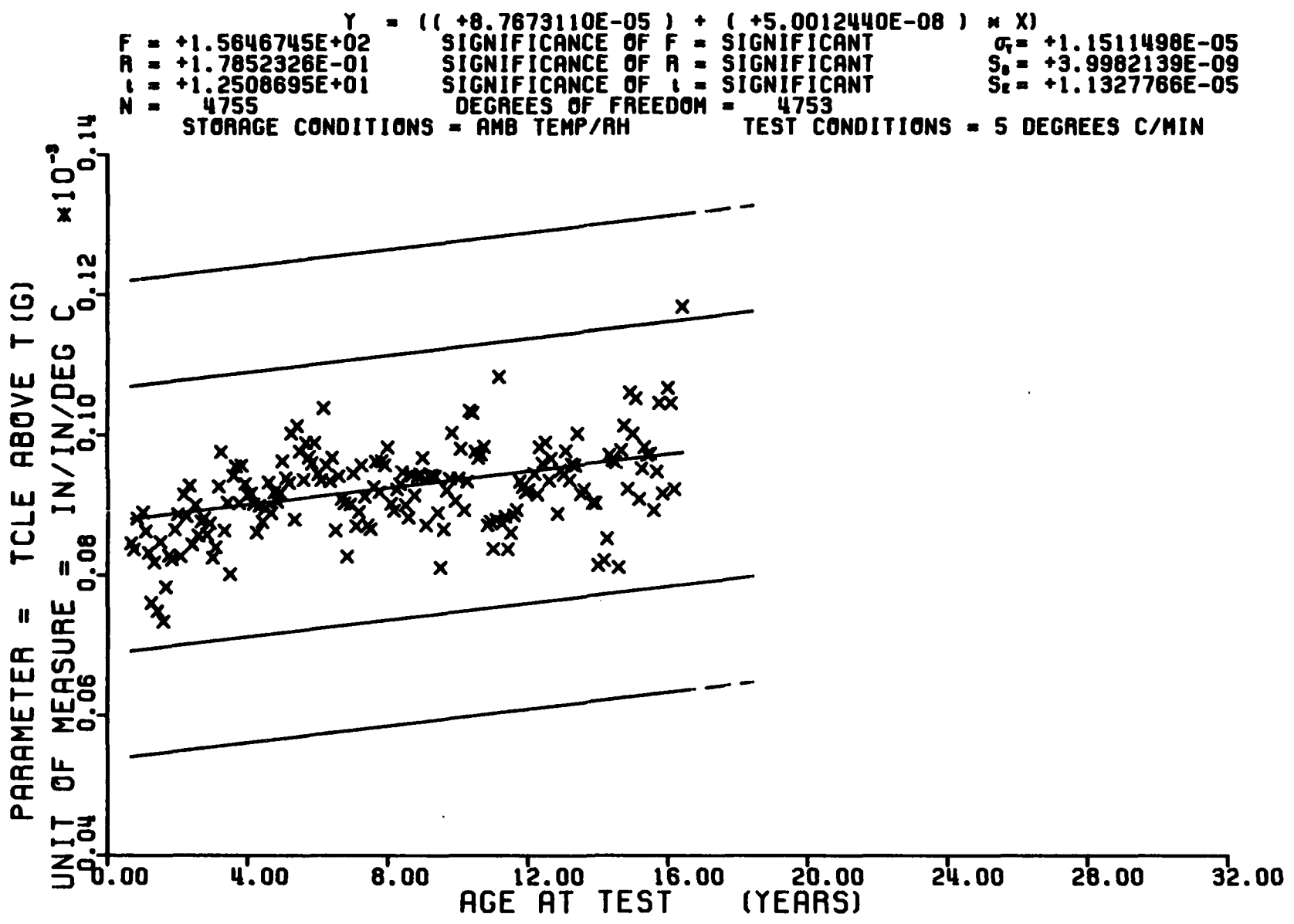
STAGE 1, WING 5, TP-H1011, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG

This sample size summary is applicable to figures 56 and 57.

*** SAMPLE SIZE SJMMARY ***

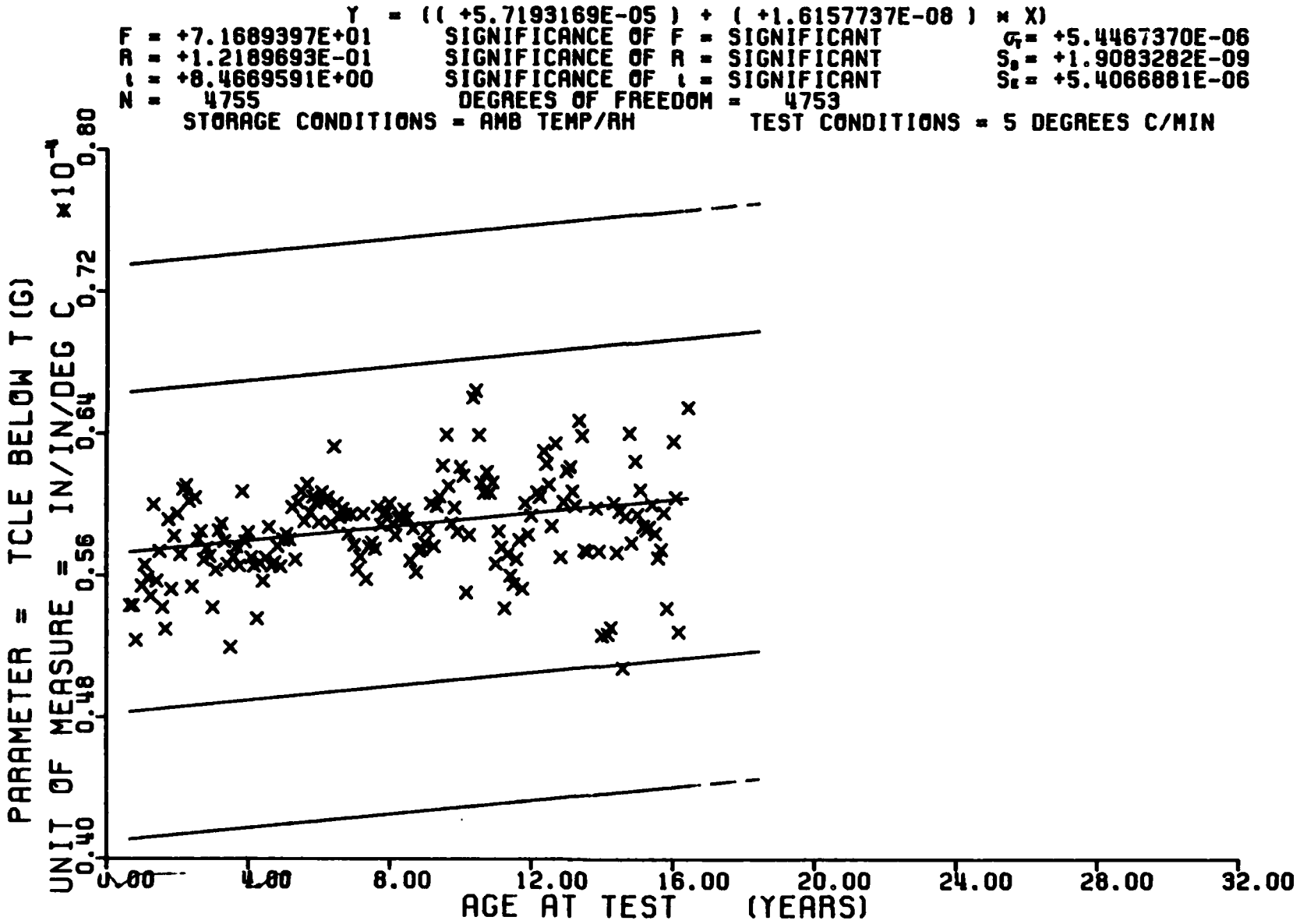
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
151	2	189	10
152	4	190	4
153	2	192	6
155	2	193	3
157	4	194	4
158	4	197	3
170	6		
171	6		
172	3		
173	4		
174	10		
175	6		
176	5		
177	8		
178	6		
179	9		
180	12		
181	5		
182	8		
183	12		
184	12		
185	13		
186	12		
187	10		
188	18		

STAGE 1, WING 5, TP-H1011, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG



STAGE 1, WING 6, TP-H1011, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG

Figure 56



STAGE 1, WING 6, TP-H1011 THERMAL COEFFICIENT OF LINEAR EXPANSION BELOW TG

Figure 57

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	3	37	13	65	14	94	4	120	8	146	8
10	1	38	4	66	23	95	9	121	16	147	8
11	1	39	7	67	34	96	20	122	16	149	8
13	1	40	5	68	20	97	22	123	8	150	4
15	1	41	17	69	16	98	28	124	2	151	10
16	1	42	5	70	31	99	25	125	2	152	6
18	7	43	2	71	10	100	8	126	2	153	2
19	2	44	2	72	14	101	4	127	4	154	4
20	4	45	3	73	20	102	7	128	2	155	8
21	4	46	3	74	14	103	10	130	4	156	6
22	20	47	1	75	14	104	11	131	12	157	6
23	4	48	4	76	1	105	6	132	8	158	4
24	4	49	3	79	6	106	12	133	7	159	6
25	6	50	3	81	8	108	4	134	8	160	4
26	14	51	3	82	2	109	4	135	6	161	6
27	2	53	3	84	2	110	4	136	4	162	1
28	4	56	3	85	4	111	4	137	4	163	2
29	14	57	5	86	8	112	4	138	4	165	2
30	12	58	4	87	3	113	8	139	6	166	6
31	10	59	13	88	6	114	2	140	6	167	6
32	3	60	18	89	2	115	6	141	2	168	4
33	6	61	23	90	4	116	4	142	14	169	2
34	10	62	21	91	5	117	4	143	4	170	6
35	9	63	32	92	6	118	4	144	6	171	4
36	22	64	23	93	2	119	2	145	2	172	6
										175	6
										192	2

STAGE I WING 6 TGA IGNITION TEMPERATURE, 9 DEGREE C RISE/MINUTE

This sample size summary is applicable to figures 58 and 59.

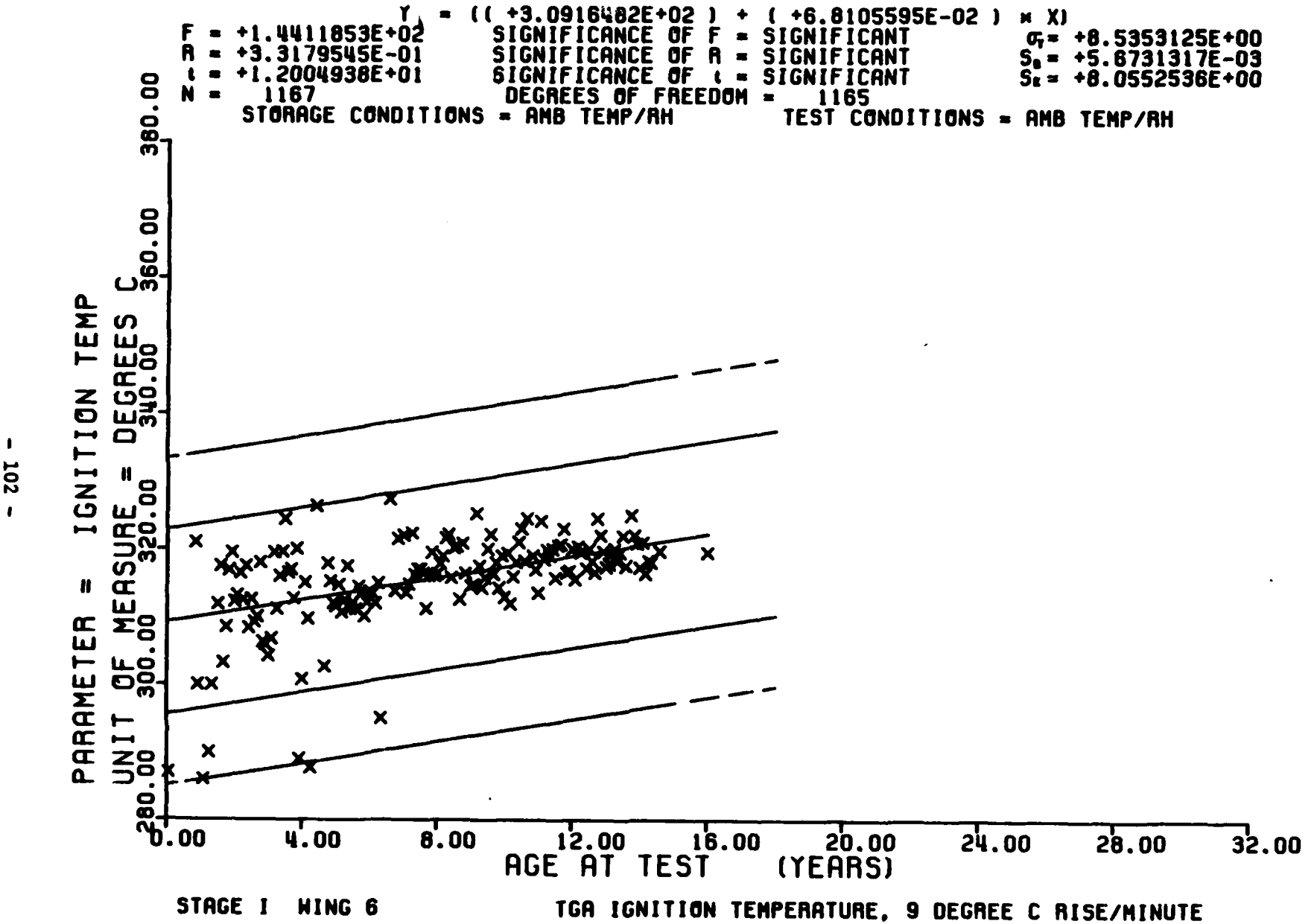

Y = ((+3.0916482E+02) + (+6.8105595E-02) x X)
F = +1.4411853E+02 SIGNIFICANCE OF F = SIGNIFICANT σr = +8.5353125E+00
R = +3.3179545E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +5.6731317E-03
t = +1.2004938E+01 SIGNIFICANCE OF t = SIGNIFICANT Sa = +8.0552536E+00
N = 1167 DEGREES OF FREEDOM = 1165
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = IGNITION TEMP
UNIT OF MEASURE = DEGREES C
280.00
300.00
320.00
340.00
360.00
380.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE I WING 6
TGA IGNITION TEMPERATURE, 9 DEGREE C RISE/MINUTE

Figure 58

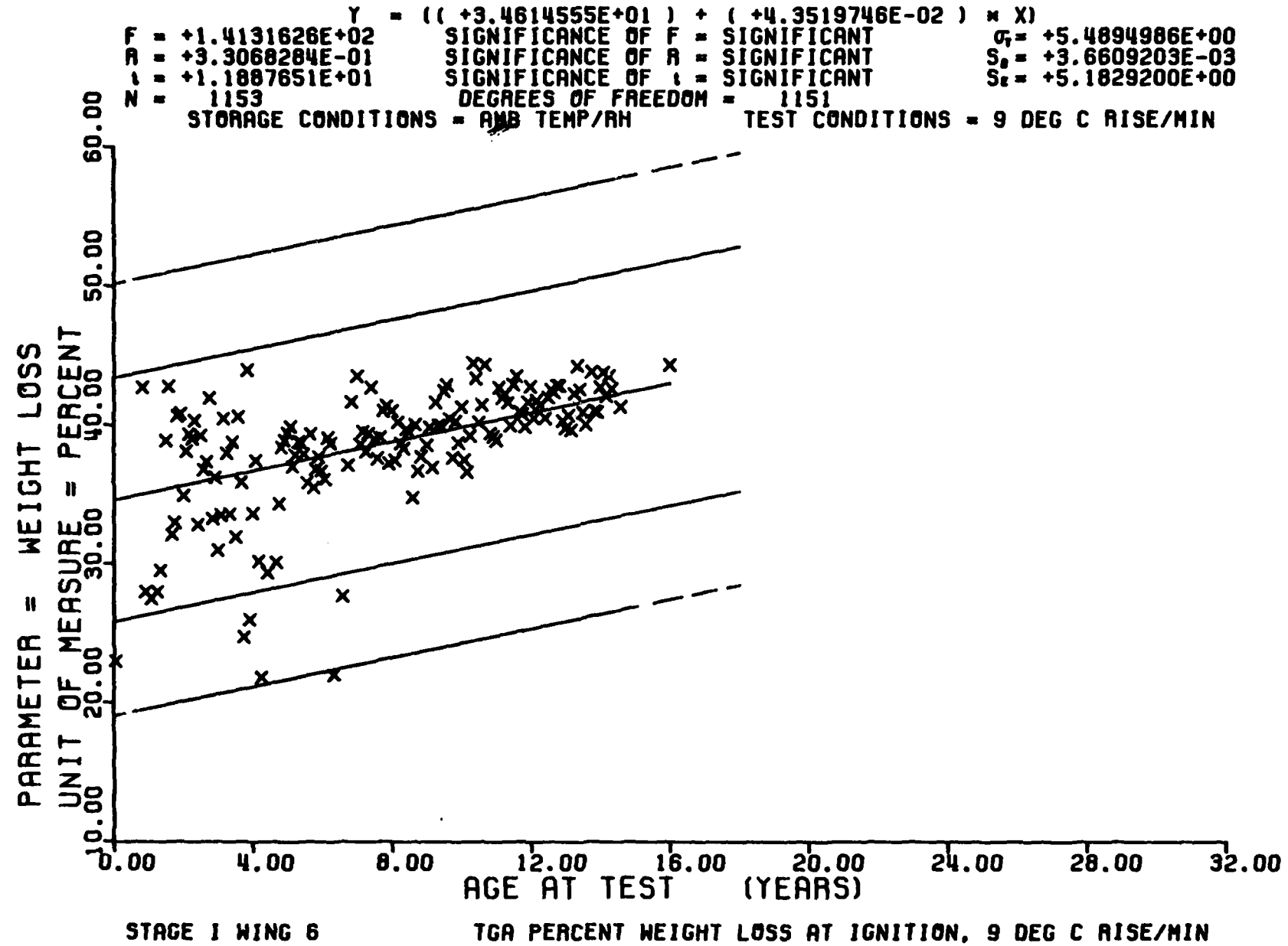

Y = ((+3.4614555E+01) + (+4.3519746E-02) * X)
F = +1.4131626E+02 SIGNIFICANCE OF F = SIGNIFICANT
R = +3.3068284E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +1.1887651E+01 SIGNIFICANCE OF t = SIGNIFICANT
N = 1153 DEGREES OF FREEDOM = 1151
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = 9 DEG C RISE/MIN
PARAMETER = WEIGHT LOSS
UNIT OF MEASURE = PERCENT
60.00
50.00
40.00
30.00
20.00
10.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE I WING 6
TGA PERCENT WEIGHT LOSS AT IGNITION, 9 DEG C RISE/MIN

Figure 59

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
5	9	30	25	55	28	80	34	105	8	130	62
6	27	31	28	56	32	81	35	106	15	131	39
7	11	32	23	57	27	82	30	107	6	132	24
8	14	33	19	58	41	83	30	108	14	133	16
9	12	34	33	59	33	84	18	109	15	134	6
10	3	35	24	60	44	85	20	110	4	135	12
11	3	36	35	61	41	86	16	111	6	136	8
12	24	37	24	62	35	87	19	112	14	137	8
13	15	38	9	63	47	88	20	113	37	138	10
14	18	39	22	64	25	89	32	114	58	139	6
15	9	40	21	65	30	90	32	115	35	140	10
16	29	41	5	66	32	91	15	116	11	141	8
17	14	42	11	67	64	92	22	117	25	142	20
18	30	43	12	68	35	93	26	118	42	143	40
19	10	44	6	69	42	94	36	119	2	144	16
20	11	45	9	70	81	95	33	120	16	146	12
21	24	46	15	71	51	96	56	121	12	147	6
22	16	47	47	72	38	97	62	122	13	148	2
23	13	48	41	73	34	98	70	123	3	149	16
24	9	49	38	74	36	99	59	124	8	150	2
25	27	50	27	75	41	100	63	125	17	151	6
26	20	51	28	76	19	101	60	126	17	152	4
27	21	52	36	77	14	102	39	127	5	154	2
28	25	53	39	78	22	103	38	128	23	155	2
29	20	54	19	79	26	104	12	129	11	156	4

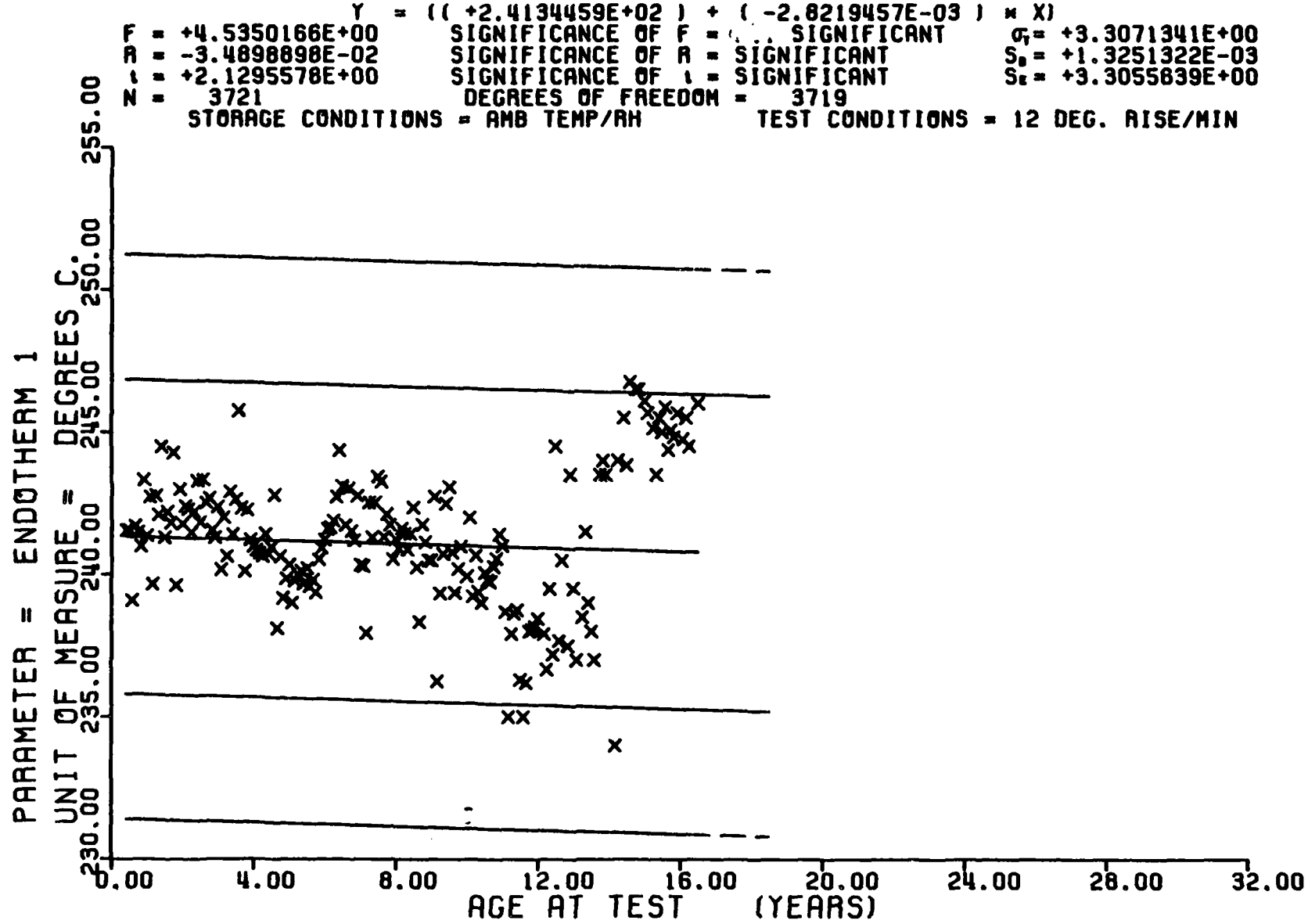
STAGE 1 WING 6. TP-H 1011. DTA. ENDOTHERM 1. 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figures 60 and 61.

*** SAMPLE SIZE SUMMARY ***

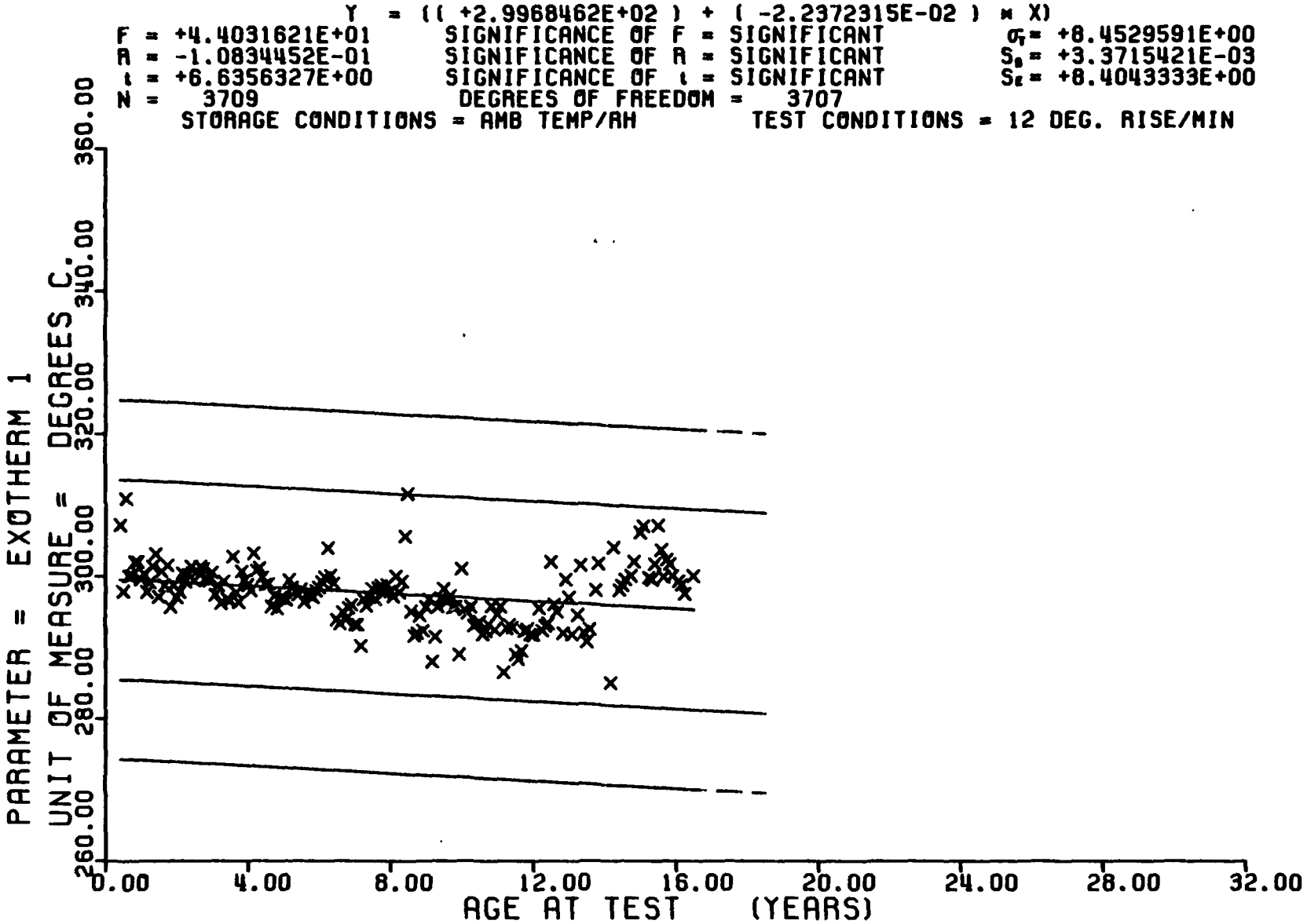
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
157	5	190	6
159	4	191	3
160	4	193	4
161	4	194	4
162	4	195	2
163	2	198	2
165	2		
166	4		
167	2		
170	2		
171	4		
173	2		
174	6		
175	4		
177	4		
178	2		
190	12		
181	6		
183	8		
184	4		
185	6		
186	16		
187	8		
188	3		
199	14		

STAGE 1 WING 6. TF-H 1011. DTA. ENDOTHERM 1. 12 DEGREE CENTIGRADE RISE/MIN



STAGE 1 WING 6, TP-H 1011, DTA, ENDOTHERM 1, 12 DEGREE CENTIGRADE RISE/MIN

Figure 60



STAGE 1 WING 6, TP-H 1011, DTA, EXOTHERM 1, 12 DEGREE CENTIGRADE RISE/MIN

Figure 61

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	34	26	59	29	84	16	109	15	134	5
9	5	35	21	60	42	85	16	110	4	135	10
10	3	36	25	61	34	86	15	111	6	136	8
12	17	37	19	62	28	87	17	112	11	137	7
13	10	38	7	63	36	88	18	113	35	138	9
14	9	39	18	64	16	89	32	114	57	139	6
15	5	40	19	65	22	90	31	115	31	140	10
16	22	41	5	66	26	91	15	116	9	141	7
17	14	42	11	67	53	92	19	117	24	142	16
18	18	43	10	68	31	93	25	118	41	143	35
19	4	44	4	69	31	94	32	119	2	144	14
20	11	45	5	70	67	95	31	120	12	146	11
21	22	46	9	71	50	96	52	121	12	147	5
22	13	47	42	72	31	97	53	122	13	148	2
23	10	48	31	73	28	98	67	123	3	149	15
24	9	49	30	74	31	99	56	124	9	150	1
25	20	50	17	75	32	100	58	125	17	151	4
26	16	51	15	76	16	101	51	126	16	152	4
27	12	52	25	77	14	102	33	127	5	154	2
28	19	53	30	78	21	103	33	128	19	155	2
29	18	54	16	79	26	104	11	129	10	156	4
30	22	55	27	80	34	105	7	130	50	157	4
31	21	56	30	81	33	106	15	131	37	159	4
32	22	57	25	82	30	107	4	132	22	160	3
33	11	58	27	83	26	108	12	133	14	161	4

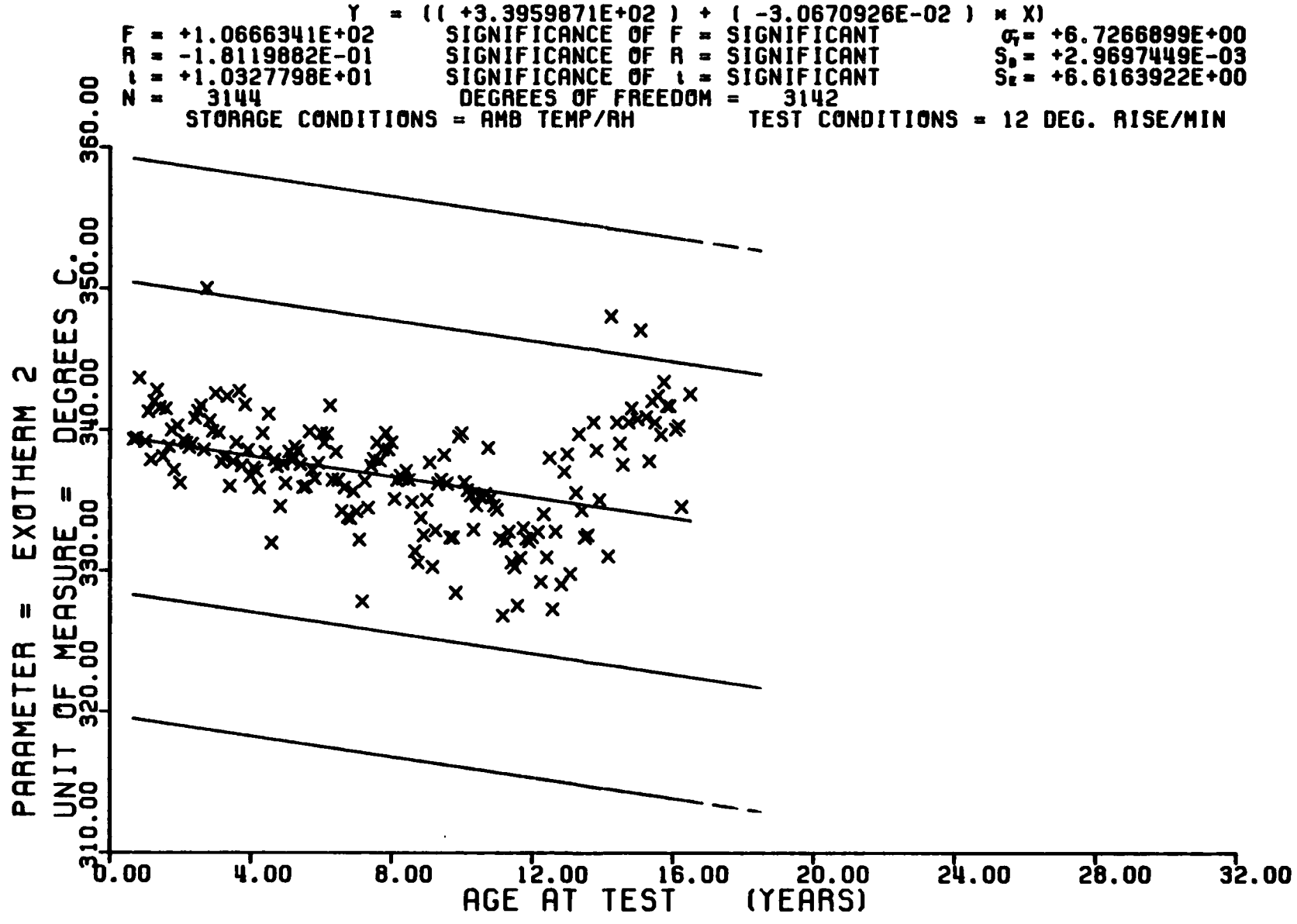
STAGE 1 WING 6, TP-H 1011, DTA, EXOTHERM 2, 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figure 62.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
162	3	195	2
163	2	198	2
165	2		
166	2		
167	1		
170	2		
171	4		
173	2		
174	5		
175	4		
177	4		
178	2		
180	11		
181	6		
183	8		
184	4		
185	4		
186	14		
187	8		
188	8		
189	14		
190	6		
191	3		
193	3		
194	4		

STAGE 1 WING 6. TP-H 1011. DTA. EXOTHERM 2. 12 DEGREE CENTIGRADE RISE/MIN



STAGE 1 WING 6, TP-H 1011, DTA, EXOTHERM 2, 12 DEGREE CENTIGRADE RISE/MIN

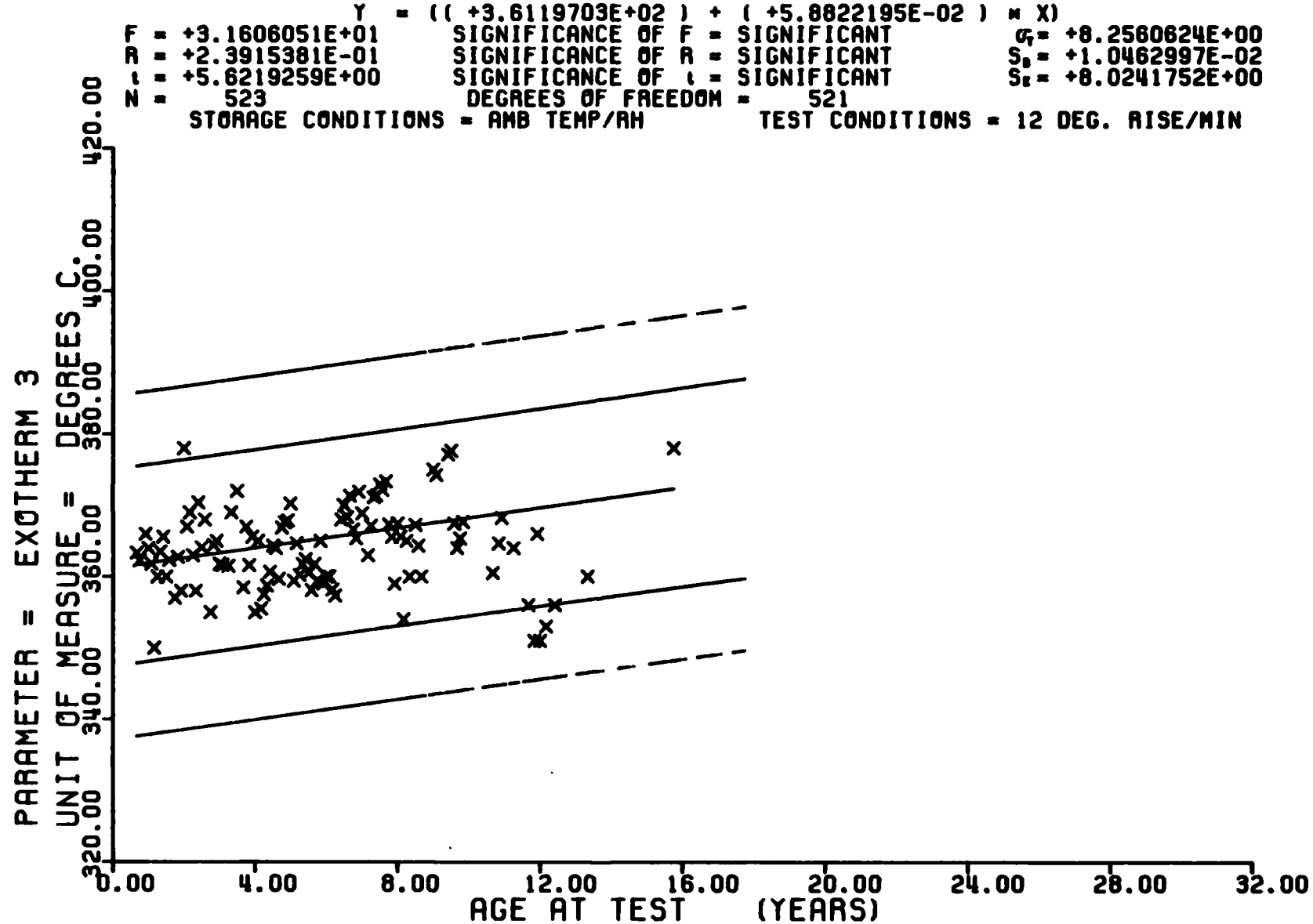
Figure 62

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	36	4	64	4	91	6	135	3
9	7	37	5	65	7	92	3	140	1
11	3	39	2	66	4	93	3	142	2
12	4	40	5	67	11	94	7	143	4
13	5	42	3	68	8	95	2	144	1
14	3	44	2	69	7	96	9	146	1
15	1	45	1	70	4	97	5	149	1
16	4	46	5	71	2	98	1	160	1
17	5	47	7	72	6	99	1	186	1
18	5	48	8	73	4	100	1	189	1
19	5	49	2	74	6	102	4		
21	2	50	2	75	9	103	3		
22	4	51	2	77	3	104	1		
23	1	52	4	78	3	108	3		
24	1	53	6	79	18	109	4		
25	1	54	3	80	12	110	1		
26	2	55	5	81	10	113	11		
27	4	56	3	82	9	114	21		
28	3	57	7	83	8	115	7		
29	5	58	5	84	7	116	2		
30	9	59	7	86	1	117	3		
31	4	60	4	87	9	118	3		
33	4	61	7	88	8	126	2		
34	5	62	6	89	16	130	9		
35	4	63	5	90	12	131	4		

STAGE 1 WING 6. TF-H 1011. DTA. EXOTHERM 3. 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figure 63.



STAGE 1 WING 6, TP-H 1011, DTA, EXOTHERM 3, 12 DEGREE CENTIGRADE RISE/MIN

Figure 63

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
5	9	31	25	56	29	81	28	106	12	131	33
6	27	32	23	57	20	82	22	107	6	132	24
7	11	33	15	58	36	83	22	108	11	133	16
8	11	34	28	59	26	84	13	109	11	134	6
9	5	35	21	60	39	85	20	110	3	135	10
10	3	36	28	61	33	86	15	111	6	136	8
12	20	37	18	62	27	87	13	112	12	137	8
13	10	38	9	63	42	88	13	113	29	138	10
14	17	39	20	64	20	89	16	114	37	139	6
15	7	40	16	65	23	90	23	115	29	140	7
16	23	41	5	66	29	91	11	116	10	141	4
17	10	42	8	67	51	92	15	117	23	142	16
18	25	43	11	68	26	93	23	118	39	143	38
19	6	44	5	69	36	94	28	119	2	144	16
20	2	45	7	70	77	95	32	120	16	146	12
21	12	46	10	71	49	96	45	121	12	147	6
22	7	47	40	72	32	97	53	122	13	148	2
23	12	48	31	73	28	98	67	123	3	149	16
24	9	49	35	74	31	99	52	124	10	150	2
25	26	50	23	75	33	100	62	125	17	151	6
26	19	51	27	76	18	101	59	126	17	152	4
27	18	52	14	77	11	102	34	127	5	154	2
28	22	53	34	78	19	103	31	128	21	155	2
29	15	54	16	79	9	104	10	129	11	156	4
30	20	55	23	80	23	105	5	130	58	157	5

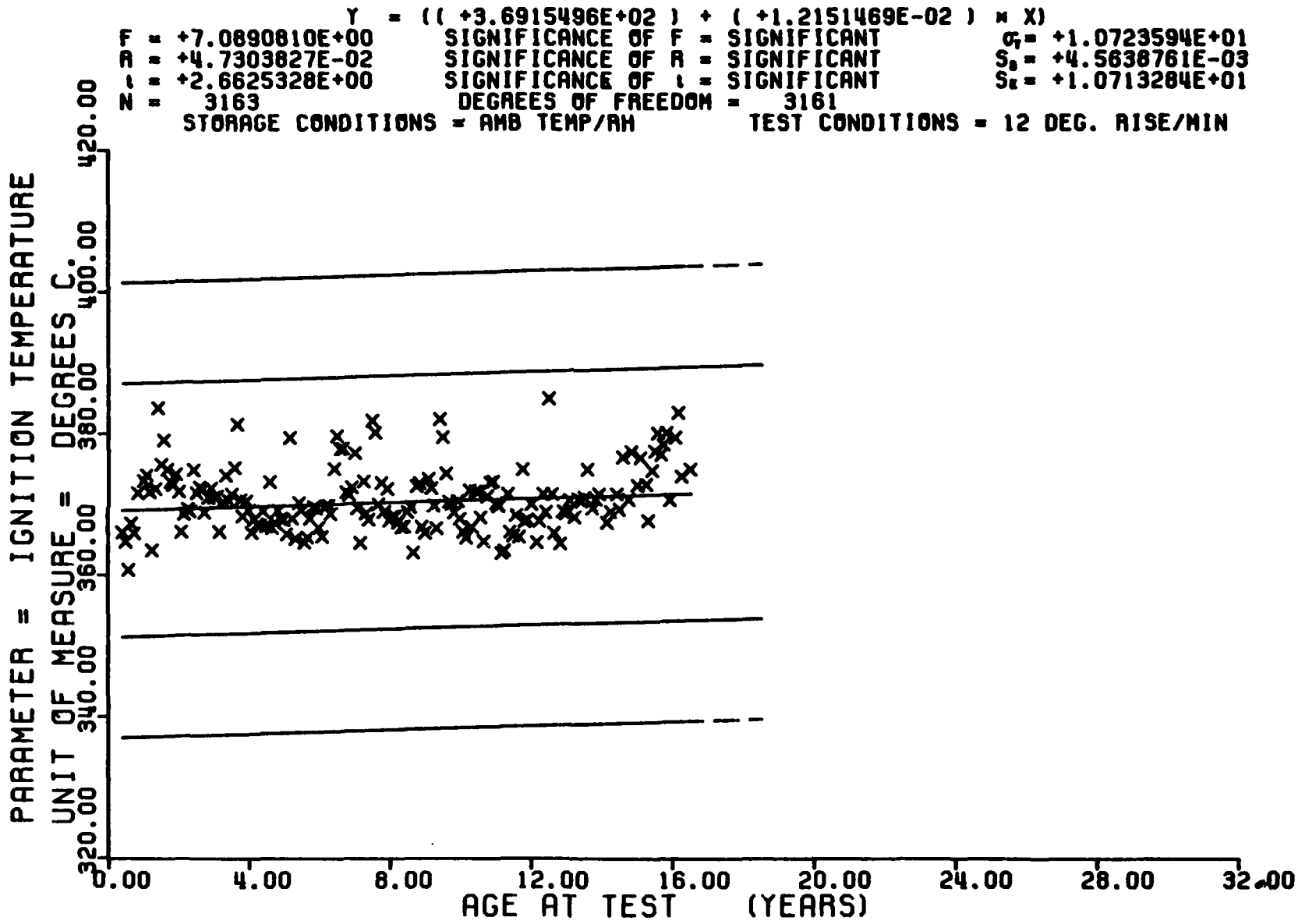
STAGE 1 WING 6, TP-H 1011, DTA, IGNITION TEMPERATURE, 12 DEGREE CENT. RISE/MIN

This sample size summary is applicable to figure 64.

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
159	4	191	3
160	4	193	4
161	4	194	4
162	4	195	2
163	2	198	2
165	2		
166	4		
167	2		
170	2		
171	4		
173	2		
174	6		
175	4		
177	4		
178	2		
180	12		
181	6		
183	8		
184	4		
185	6		
186	16		
187	8		
188	8		
189	13		
190	6		

STAGE 1 WING 6, TF-H 1011, DTA, IGNITION TEMPERATURE, 12 DEGREE CENT, RISE/MIN



STAGE 1 WING 6, TP-H 1011, DTA, IGNITION TEMPERATURE, 12 DEGREE CENT. RISE/MIN

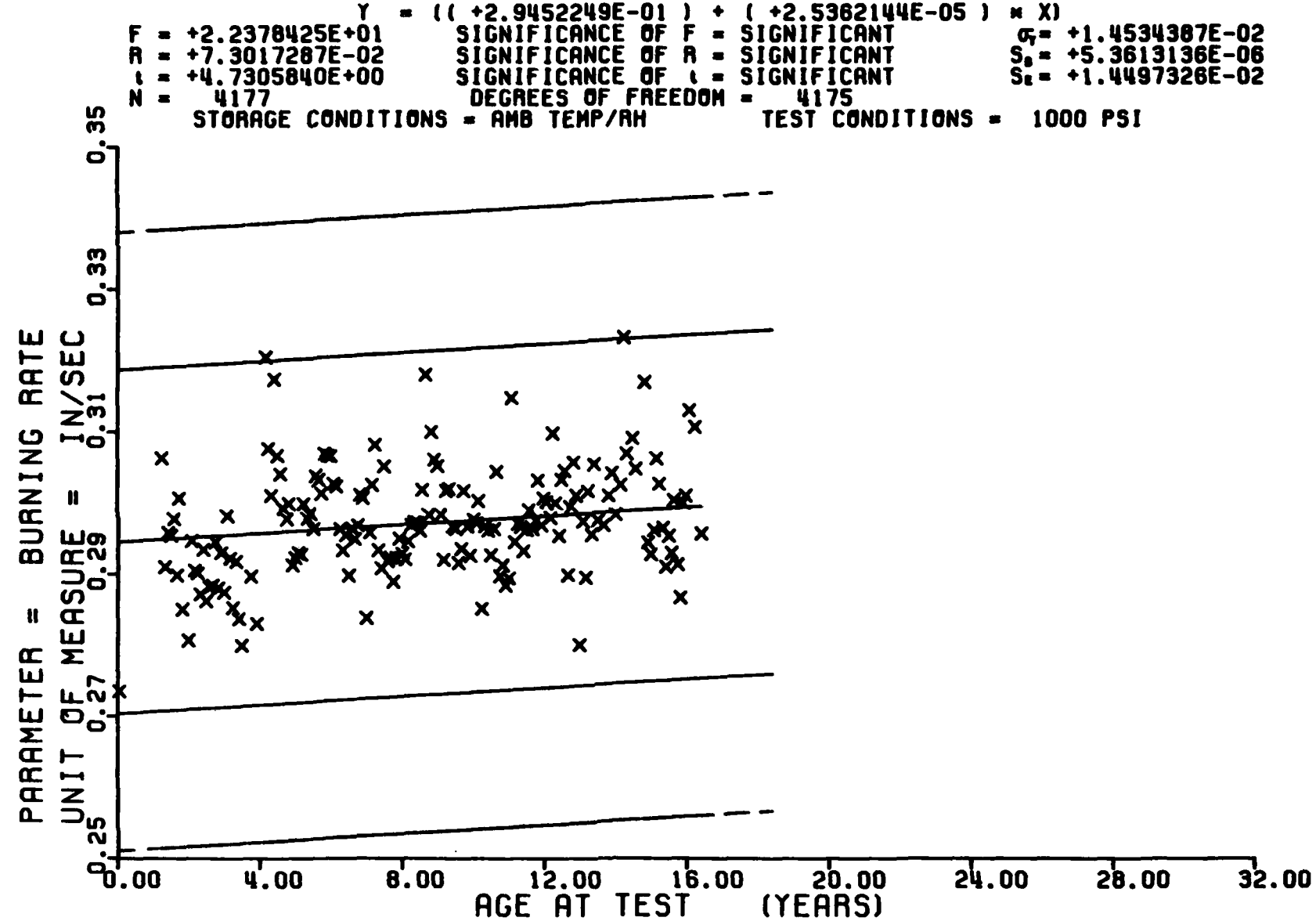
Figure 64

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	2	40	33	70	48	95	41	120	79	145	33
15	3	41	6	71	37	96	72	121	30	146	45
16	9	42	19	72	72	97	54	122	24	147	12
17	15	45	3	73	57	98	95	123	9	148	3
18	12	47	9	74	86	99	81	124	11	149	12
19	12	50	12	75	87	100	55	125	6	150	9
20	18	51	21	76	51	101	47	126	12	151	9
21	3	52	25	77	27	102	42	127	22	152	12
22	3	53	33	78	8	103	12	128	15	153	6
24	3	54	36	79	30	104	12	129	39	154	9
25	3	55	32	80	15	105	12	130	57	155	6
26	8	56	23	81	34	106	3	131	89	156	3
27	24	57	27	82	24	107	6	132	30	157	12
28	27	58	45	83	15	108	18	133	17	158	12
29	46	59	42	84	9	109	8	134	18	159	6
30	18	60	44	85	18	110	3	135	27	160	6
31	42	61	44	86	12	111	18	136	18	161	12
32	31	62	79	87	6	112	20	137	9	162	14
33	43	63	66	88	15	113	24	138	18	164	6
34	29	64	59	89	16	114	63	139	50	166	3
35	43	65	46	90	28	115	61	140	24	167	6
36	53	66	19	91	22	116	25	141	39	168	6
37	24	67	33	92	32	117	30	142	21	170	6
38	19	68	30	93	18	118	28	143	15	171	9
39	21	69	36	94	19	119	27	144	36	172	9
								174	12	190	6
								175	9	191	3
								178	18	192	9
								179	15	193	3
								180	12	195	6
								181	9	197	3
								182	12		
								183	9		
								184	18		
								185	9		
								186	18		
								187	15		
								188	18		
								189	12		

STAGE I WING 6 TP-H1011 BURNING RATE AT 1000 PSI

This sample size summary is applicable to figure 65



STAGE I WING 6 TP-H1011 BURNING RATE AT 1000 PSI

Figure 65

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Solid Propellant
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report contains propellant test results from cartons of TP-H1011 bulk propellant representing LGM-30F & G First Stage Minuteman Motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMWRBA Project M34929C.

The data from this test period are combined with data from previous testing and entered into the G085 Computer for storage, analysis, and regression analysis. From the statistical analysis of all data tested to date (sixteen years for F and

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G), significant degradation of the propellant does not appear likely for at least two years past the oldest data point.

Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the GO85 System.

END

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